



Scalar 1000 Library

**Maintenance  
Guide**

 Advanced Digital Information Corp

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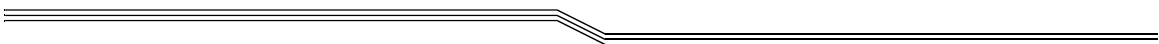
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# 1

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## Overview

This manual contains information and instructions necessary for the installation and service of the Scalar 1000<sup>1</sup> library. The topics discussed in this chapter are:

- Overview
- Intended Audience
- Organization
- Associated Documents
- Explanation of Symbols and Notes
- Assistance

## Intended Audience

This Manual is intended for trained service personnel who install and repair all models of the ADIC Scalar 1000.

## Organization

This publication contains the following information.

Chapter 1	<i>Introduction</i> - Describes the contents of the <i>Maintenance</i> guide.
Chapter 2	<i>Subsystem Description</i> - Provides a description of the Scalar 1000 and functions.
Chapter 3	<i>Safety</i> - General Safety Procedures
Chapter 4	<i>Panel</i> - Provides a overview of the Operator Panel and functions.
Chapter 5	<i>Start</i> - Provides a starting point for all maintenance actions.
Chapter 6	<i>Service Action Codes</i> - Provides all service actions for reported symptoms.
Chapter 7	<i>Locations</i> - Provides information to locate major components in the subsystem.

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1. Scalar 1000 is a trademark of ADIC Throughout the remainder of this document, we refer to Scalar 1000 library as Scalar 1000

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Chapter 8	<i>Replacement Procedures</i> - Provides procedures for making checks, adjustments, removals and replacements on the subsystem.
Chapter 9	<i>Power</i> - Describes all the power functions for the subsystem.
Chapter 10	<i>Cables</i> - Provides cable diagrams for the subsystem.
Chapter 11	<i>Installation</i> - Provides procedures to install the Scalar 1000 Subsystem.

## Associated Documents

Additional information related to the subsystem is available in the following publications:

600839	Scalar 1000 Planning Guide
600840	Scalar 1000 SCSI Reference Guide
600605	Scalar 1000 Operator Guide for Firmware Level <b>1.0</b> or older
600664	Scalar 1000 Operator Guide for Firmware Level <b>1.1</b>
600688	Scalar 1000 Operator Guide for Firmware Level <b>2.0</b>
600685	Scalar 1000 Operator Guide for Firmware Level <b>2.10</b>
600837	Scalar 1000 Operator Guide for Firmware Level <b>2.24</b>
600963	Scalar 1000 Operator Guide for Firmware Level <b>2.30</b>

## Explanation of Symbols and Notes

The following symbols and highlighted passages note important information .



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Detailed explanations of these symbols are found in *Hazard Alert Messages* on page 3-4.



Important information for understanding this guide.



Provides critical information or instruction for maintenance operations that could result in personal injury or loss of life.



**Note**

Information important for understanding this guide.

*Italics*

Headline, e. g., Chapter 3, *Safety*

**Bold**

Important words appearing on the step by step instructions.

Courier

Command/Status lines appearing on the Operator Panel,

## Assistance

If problems cannot be solved with the aid of this document, contact the ADIC Technical Assistance Center (ATAC).

- United States      1-800-827-3822
- Germany/Africa    00.800.9999.3822
- France              33.1.3087.5300

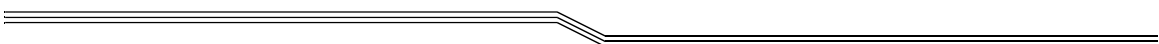
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# 2

## Subsystem Description

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## Overview

This chapter describes the Scalar 1000 and its functions.

## Subsystem Description

The Scalar 1000 automates the retrieval, storage and control of half-inch cartridge tapes (3480, 3490E, 3590, NCTP, DLT) and 8mm cartridge tapes (AIT). Cartridges are mounted and demounted on tape drives via supporting software from the host without the intervention of an operator.

The Scalar 1000 configuration can contain a maximum of 4 frames. The Scalar 1000 consists of a Control Module and up to 3 Expansion Modules. The Control Module contains Library control hardware, the cartridge accessor, an Insert/Eject station, an Operator panel, cartridge storage and it may contain up to 12 tape drives. The Expansion Module can contain up to 12 tape drives and cartridge storage. The maximum number of drives that can be configured in each module varies and is dependent on the type of tape drive as shown in the following table:

**Table 2-1** Maximum number of drives within each Library module

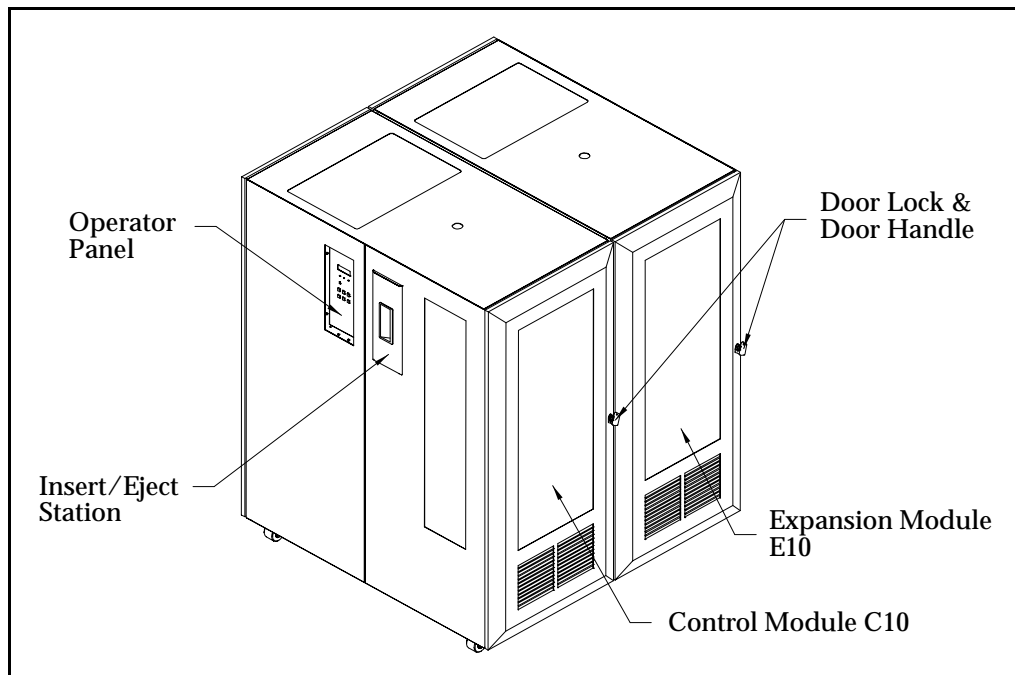
	<b>3610/3590/ NCTP type Tape Drives</b>	<b>DLT or AIT type Tape Drives</b>
Control Module	4	12
Expansion Module	4	12

The Scalar 1000 can be configured for 118 to 778 half-inch cartridges or 237 to 1182 AIT cartridges and 1 to 48 tape drives.

There are six models of the Scalar 1000 Library:

- Control Module **C10** and Expansion Module **E10** frames can accommodate different tape drive types and are designed for mixed-media systems. **At the present time, Mixed Media is restricted to only half-inch type media (3480, 3490E, 3590, NCTP, DLT) in a Library. It is not possible to mix half-inch and 8mm cartridges.**
- Control Module **C20** and Expansion Module **E20** frames have smaller footprints and can only accommodate the DLT drives.
- Control Module **C30** and Expansion Module **E30** frames also have smaller footprints and can only accommodate the AIT drives.

**Frames of different models cannot be intermixed in a Library System,** an example of the Scalar 1000 Library system with one Control Module Model C10 and one Expansion Module Model E10 is illustrated in Figure 2-1.



**Figure 2-1**      Scalar 1000 Subsystem (Control Module C10 & 1 Expansion Module E10)

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## Host Attachment

The Scalar 1000 can be connected to one or two SCSI busses, the busses are independent of each other and can be Single Ended, Differential or Low Voltage Differential. Both ends of each bus must be terminated and a terminator is shipped with each SCSI adapter card ordered. The minimum configuration of a Scalar 1000 library requires one SCSI adapter and the SCSI type (Single Ended, Differential or Low Voltage Differential) must be specified at the time of order. Although the Scalar 1000 can be attached to a wide SCSI bus, it is not a wide SCSI device and its SCSI ID must be in the range of 0 to 7.

The Scalar 1000 can also be connected to a Fibre Channel Host via the ADIC Fibre Channel Router (FCR). The ADIC FCR provides one or two SCSI parallel bus connections and a Fibre Channel connection, translating (bridging) the SCSI protocol between these two media types. Up to six FCR's can be installed in each Scalar 1000 frame (the installation instruction is included with each FCR kit). Refer to the ADIC Web site "[www.adic.com](http://www.adic.com)" for specifications of different ADIC FCR models.

## Functional Description

The Scalar 1000 can be installed on a solid or a raised floor.

The Scalar 1000 configuration must include at least one tape drive. A maximum of 48 drives can be included. The Control Module contains cartridges, Library control hardware, tape drives and a cartridge accessor. The tape cartridges are stored in cells on the storage racks, the Scalar 1000 currently supports half-inch tape cartridges (3480, 3490E, 3590, NCTP, DLT) and 8mm tape cartridges (AIT) in its storage cells if the corresponding tape drive(s) are installed.

The cartridge accessor moves cartridges between storage cells, tape drives and the Insert/Eject station. A picker and a gripper are used to get/put cartridges in a cell or a tape drive feed slot. A barcode scanner and a touch-tip sensor on the cartridge accessor identify the cartridge or cell in front of the gripper. The Insert/Eject station allows cartridges to be added or removed from the Scalar 1000 without interrupting the operation of the Library.



The cartridge storage cells, cartridge accessor are accessed by opening the door on the front of the Scalar 1000 module in which the component is found, the tape drives are accessed by opening the door on the rear of the Scalar 1000. Maintenance activity is performed by using these doors.

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Requests issued from the host result in cartridge movement in the library. The primary requests issued are for mounting and demounting cartridges to and from the tape drives and for inserting and ejecting volumes to or from the library. The host has records of the physical location of a volume in the library. The physical location is also managed by the library. Each volume must have a machine and operator-readable external label to identify a volume in the library during initial inventory and any time a volume is added to the library. The library stores the physical location of the cartridge in an inventory database based on the cartridge volume serial number (volser). All host requests for operations involving movement or use of a volume need only reference the physical location of the volume for the library to perform the request.

In addition to requesting movement of cartridges in the library, the host can obtain status, performance, configuration information, and information about the cartridges stored in the Scalar 1000.

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## Functional Units

The Scalar 1000 consists of the following functional units:

- Tape drives
- Library control hardware
- Cartridge storages
- Cartridge accessor
- Insert/Eject station

### Tape Drives

The Scalar 1000 supports the following tape drives:

- 3490E type drive (Philips/LMS 3610)
- 3590 type drive (IBM 3590/3590E Model B1A/E1A)
- NCTP type drive (Philips/LMS NCTP)
- DLT type drive (ADIC Models 4001 and 7001)
- DLT type drive (ADIC Models 4001S, 7001S and 8001S)
- AIT type drive (ADIC Model AIT 3102 and AIT 5002)

### Library Control Hardware

The Library control hardware controls all operations in the Scalar 1000, including the interaction between the library and operators. The Library control firmware creates and maintains the Scalar 1000 configuration, the physical location of the cartridge accessor, and the inventory of cartridges. The database is kept in the flash memory of the Library control hardware.

### Cartridge Storage

The Scalar 1000 contains cartridge storage cells in all attached modules in addition to any tape drives installed. The control module must be the first frame in the library.

**Storage Cell Numbering:** The following table shows the coordinates for the storage cells.

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 **Note**

This coordinate system is only valid for Libraries installed with Firmware 2.24 or earlier.

**Table 2-2** Storage Cell Coordinates for Libraries with Firmware 2.24 or earlier

1	B	12
Frame	Column	Row

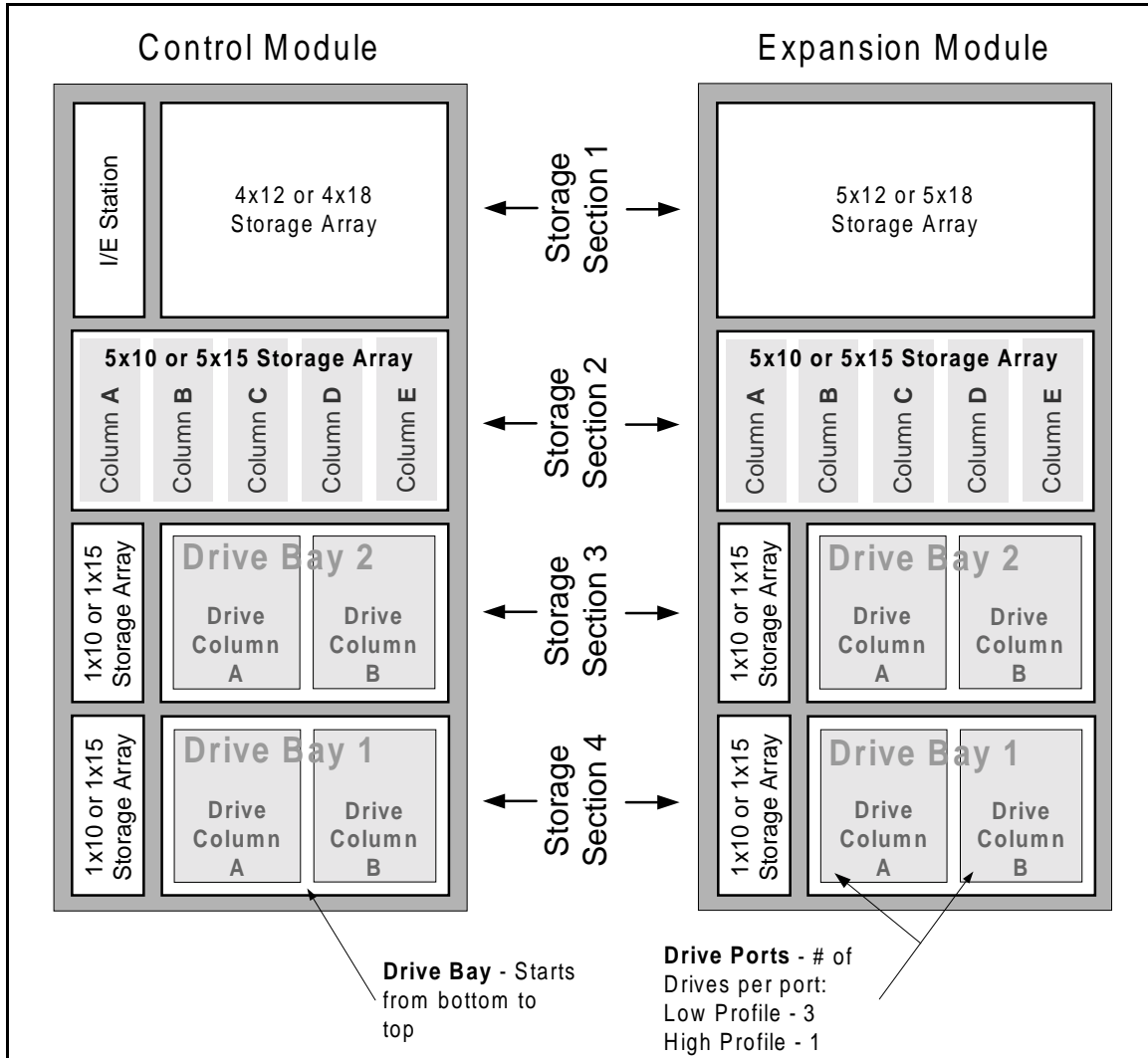
The **Frame** number can be from 1 to 4, the **Columns** are letters A-E in each module, the **Rows** are numbered from top to bottom (1 to 42 maximum for half-inch cartridges and 1 to 63 maximum for AIT cartridges).

For Libraries installed with Firmware level 2.3 or later, use the following coordinates system to locate different elements (storage cell, Drive, etc.) within the library:

**Table 2-3** Element Coordinates for Libraries with Firmware 2.3 or later

Element Type	ID	Frame	Section	Column	Row
Storage	S	01 - 04	1 - 4	A - E	01 - 18
I/E Station	I	01	1	A	01 - 18
Drives	D	01 - 04	1 - 2	A - B	01 - 06

Refer to the diagram in Figure 2-2 on page 2-9 for additional information used in identifying the various fields in the above coordinate system.



**Figure 2-2** Coordinate systems for Libraries with Firmware 2.3 or later

To manipulate the media within the library, the host must reference each movement with source and target designations. This is done via element addressing, which specifies precisely which cells within the library are to be used. Toward that end, the following addressing scheme will be used for the library.

**Table 2-4** Element Addressing

Cell Type	Address Range	
	Half-Inch	AIT
Storage	0 - 787	0 - 1181
Insert/Eject	788 - 799	1182 - 1199
Drives	800 - 847	1200 - 1247
Accessor	848	1248

## Cartridge Accessor

The cartridge accessor identifies and moves cartridges between the storage cells, tape drives and Insert/Eject station. The cartridge accessor has:

- A cartridge gripper for picking and placing cartridges in storage cells, tape drives or the Insert/Eject station.
- A barcode scanner for reading the external labels on the cartridges, the barcode scanner is used during the inventory process to locate and categorize all cartridges installed in the library. The barcode scanner is also used during the teaching process in which it reads the fiducial labels to identify the types of storage arrays and Tape drives installed in the Library (Fiducial labels are barcode labels located on tape drives and storage arrays, each label has a different value to identify the various types of storage arrays or tape drives that may be installed in the Library, refer to Figure 8-1 on page 8-15 for a list of all Fiducial labels and their part numbers).
- An X-Axis drive for moving the picker assembly the length of the rails in the control module and the expansion module(s).
- A Y-Axis drive for moving the picker assembly vertically in the control module and the expansion module(s).


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## Insert/Eject Station

This station allows the insertion and ejection of cartridges without interrupting the normal operation of the library, the Insert/Eject Station has a capacity of twelve (12) half-inch cartridges or eighteen (18) 8mm cartridges. For a Mixed Media Library of half-inch and DLT cartridges, the top 6 slots of the Insert/Eject station are reserved for half-inch cartridges and the bottom 6 slots are reserved for DLT cartridges.

## Tape Cartridge

 **Note**  
Duplicate volsers  
(even with  
different media  
identifiers) are  
**NOT** supported.

The Scalar 1000 automates the retrieval, storage and control of half-inch cartridge tapes (3480, 3490E, 3590, NCTP, DLT) or 8mm cartridge tapes (AIT). The 3490E, 3590, 3590E, NCTP, DLT or AIT type tape drive(s) must be installed in the library.

Each tape cartridge in the Scalar 1000 must have an external label that is operator and machine readable to identify the volume serial number (volser). The external label can contain up to sixteen (16) characters for the volser (this feature requires Firmware Level 2.3 or later), they can be uppercase A-Z and numerics 0-9.

A separate single character is used to identify the cartridge *type*. For 3490/3590/NCTP type half-inch cartridges, this is a separate one character label that goes on the left side of the volser label; for DLT cartridges, the media identifier is imbedded at the end of the volser label.

- For libraries containing only one type of media, any code 39 labels will work, the single media identifier character labels on half-inch cartridges are not needed and not read, the media identifier on DLT cartridges is stripped off.
- For libraries containing different media types, **all** cartridges must have a media identifier label. Currently, in mixed media libraries, the Scalar 1000 only supports Tri-Optic labels for half-inch cartridges and special DLT cartridge labels available from Engineered Data Products, Inc.

Refer to the Operator Guide for more information on the types of labels supported by the Scalar 1000.

The external labels on the cartridges identify the cartridges to the Scalar 1000. Some software requires that the internal volser is the same as the external label on the physical volume. The following table lists the cartridge type and its identifying character:

**Table 2-5** Cartridge Type Identification

<b>Cartridge Type</b>	<b>Character Identification</b>
3480/3490	<b>1</b> (separate 1 character label)
3490E	<b>E</b> (separate 1 character label)
3590	<b>J</b> (separate 1 character label)
NCTP	<b>M</b> (separate 1 character label)
DLT CompacTape III	<b>C</b> (imbedded in the label)
DLT CompacTape IV	<b>D</b> (imbedded in the label)
DLT CompacTape IIIXT	<b>E</b> (imbedded in the label)

## **Cartridge Storage and Tape Drive Configurations**

The Scalar 1000 has expandable configurations, the storage capacity and the total number of tape drives supported is determined by the number of frames. The following table illustrates the Scalar 1000 configurations:

**Table 2-6** Scalar 1000 Configurations

Frame	3490, 3590, NCTP or DLT Cartridge Capacity	AIT Cartridge Capacity	3610/3590/NCTP Tape Drives (Models C10 and E10 only)	DLT or AIT Tape Drives
Control Module	158 118	237	1 to 2 3 to 4	1 to 12
Control Module and 1 Expansion Module	368 328 288 248	552  432	1 to 2 3 to 4 5 to 6 7 to 8	1 to 12  13 to 24
Control Module and 2 Expansion Modules	578 538 498 458 418 378	867  747  627	1 to 2 3 to 4 5 to 6 7 to 8 9 to 10 11 to 12	1 to 12  13 to 24  25 to 36
Control Module and 3 Expansion Modules	788 748 708 668 628 588 548 508	1182  1062  942  822	1 to 2 3 to 4 5 to 6 7 to 8 9 to 10 11 to 12 13 to 14 15 to 16	1 to 12  13 to 24  25 to 36  37 to 48

**In a Mixed Media Library System, the maximum number of tape drives depends on the number of frames and the drive types within each frame.**

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## Optional Features

Optional features for the Scalar 1000 are as follows:

- Differential SCSI Adapter card.
- Single-Ended SCSI Adapter card.
- Low Voltage Differential SCSI Adapter card.
- ADIC Fibre Channel Router (FCR100 or FCR200)
- Dual DC Power Supplies

## Maintenance Plan

The Scalar 1000 consists of two hardware subsystems: the library and the tape drives. The tape drive(s) are maintained using their stand-alone maintenance packages. The Scalar 1000 maintenance package supports the library and the library interfaces with the tape drives.

## Maintenance Star

### Note

For Scalar 1000 Libraries connected to an AMU server, start all Subsystem problem determination using the Log Control Center at the AMU console

Start all maintenance activity for the Scalar 1000 and the integrated subsystem using the **START** section in this manual. A symptom to action table is provided to quickly determine which procedure to use for the reported problem and how to prepare the library for service. Subsystem problem determination information is included to help determine the failing components. For hardware failures, the Field Engineer will be directed to one of the following procedures to continue with maintenance activity:

- The START procedure in this manual
- The Tape Drive(s) Maintenance Package(s)

## Preventive Maintenance (PM)

PM is performed yearly during a service call for the average library. For a high usage library, PM should be performed every 500,000 meters traveled on either the X-Axis or Y-Axis. The Scalar 1000 firmware monitors the usage and will present Service Action Code “**FB**” on the Operator Panel whenever one of the above criteria is reached. Refer to Procedure: *Preventive Maintenance* on page 8-71 for details.

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## Functional Diagram

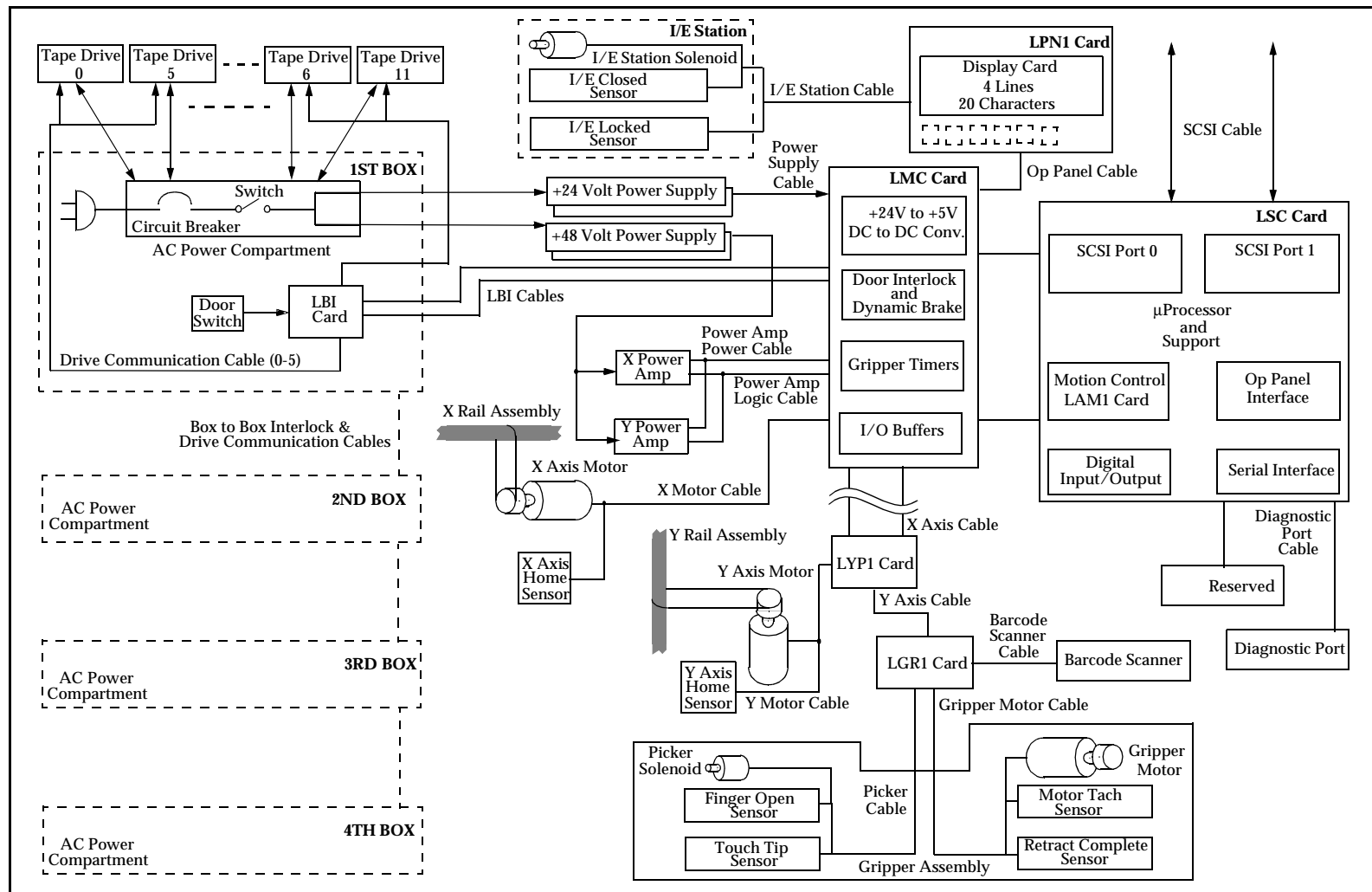
The following diagram shows the major functional areas of the Scalar 1000. The items enclosed in a box indicate that they are FRUs (Field Replaceable Units) or a major sub-assembly such as a Tape drive. The following table describes each functional area:

**Table 2-7** Scalar 1000 Major Functional Areas

FRU/Sub-Assembly	Description
LDF1/LSE1/LVD1 card	Differential, Single Ended or Low Voltage Differential SCSI adapter cards. These cards are connected to the LSC (Library Control and SCSI card) on one side and the SCSI busses on the other side.
LSC card (there are two versions of this cards: LSC1 and LSC2, refer to Chapter 8 for the correct Part Number)	Library Control and SCSI card, this card contains Microprocessor, memory, motion control, digital input and output (DI/DO), SCSI control, system controller, Operator panel interface, serial ports and real time clock.
LAM1 card	Motion control card. This card is a daughter card on the LSC card.
Display card	Operator/CE Message Display card. This card is a daughter card on the LPN1 (Operator panel card)
LMC card (there are two versions of this cards: LMC1 and LMC3, refer to Chapter 8 for the correct Part Number)	Machine Control card, it connects to the LSC card on one side and to most of the Library internal cables on the other side.
LYP1 card	Connector card, this card is mounted on the accessor and connects the X and Y moving cables to the LMC card.
LGR1 card	Gripper card, this card controls the motor, solenoid and sensors on the Gripper Assembly.
LPN1 card	Operator panel card which contains all switches, a message display and LED indicators to allow Operator/CE to communicate with the Library.
LBI card (there are two versions of this cards: LBI1 and LBI2, refer to Chapter 8 for the correct Part Number)	Library Interface card which controls the door switch and the library frames interconnection. The LBI2 also allows the Library to communicate with the installed tape drives to handle cleaning requests and to coordinate cartridge load/unload activities.

**Table 2-7** Scalar 1000 Major Functional Areas

FRU/Sub-Assembly	Description
Gripper Assembly	This assembly contains motor, solenoid, sensors and mechanical components to pick the cartridge.
Barcode Scanner	Used in reading the barcode label on each cartridge, teaching and inventory of the library subsystem.
X and Y axes motors and belts	Motors to move the accessor in X and Y directions.
X and Y Power Amplifiers	Power drivers for the X and Y motors.
Power Supplies (Single or Dual Systems)	+48V DC, +24V DC Power supplies and the +48V DC Shunt Regulator.
Insert/Eject Station	This assembly allows the Operator to insert and eject cartridges without interrupting the operation of the Library. Contains solenoid, sensors and storage rack.
AC Power Compartment (there are two versions of this subassembly: one contains AC outlets for 4 tape drives and the other contains AC outlets for 12 tape drives. Refer to Chapter 8 for the correct Part Number).	This assembly is connected to the customer's AC power source and distributes AC to all major sub-assemblies within each Scalar 1000 module (DC Power supplies, drives). It also contains a circuit breaker which controls the input AC and a switch which controls the AC distributions to the +24V DC and the +48V DC power supplies.
Tape Drive(s)	Individual Tape drive within the Control or Expansion Module.



**Figure 2-3** Scalar 1000 Functional Diagram

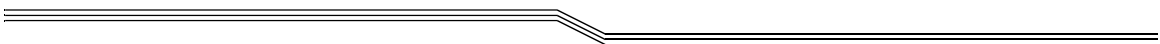
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# 3

## Safety

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## Safety Instructions

### **Note**

In addition to the safety instructions in this guide, local and professional safety rules apply.

### **Caution**

Avoid hazards when operating the equipment by practicing:

- Safety-conscious behavior
- Careful action

Read and carefully observe the hazard alert information in this guide and in the document Scalar 1000 Operator Guide.

**Knowing and observing the instructions are necessary for safe operation of the Scalar 1000 system.**

## Intended Use

The offer and the order confirmation, as well as the purposes for use defined in these documents, are part of the Scalar 1000 documentation. Any use other than those specified, is not considered intended use.

This equipment is designed for processing of:

- Magnetic tape cartridges

Any other application is not considered intended use.

ADIC is not liable for damage arising from unauthorized use of the system. The user assumes all risks in this aspect.

Intended use also includes:









- Observing the instructions supplied with the equipment (document Scalar 1000 Operator Guide and this manual)
- Observing inspection and maintenance instructions



## Hazard Alert Messages

The hazards are classified in several categories. Table 3-1 shows the relation of symbols, signal words, the actual hazard, and possible consequences.

**Table 3-1** Hazard Alert Messages

Symbol	Damage to ...	Signal Word	Definition	Consequence
 or 	<b>Persons North America</b>  <b>Persons Europe</b>	<b>DANGER</b>	Imminent hazardous situation	Death or serious injury
		<b>WARNING</b>	Potential hazardous situation	Possible death or serious injury
		<b>CAUTION</b>	Less hazardous situation	Possible minor or moderate injury
	<b>Persons</b>		Imminent hazardous electrical situation	Death or serious injury
	<b>Persons</b>	<b>CAUTION</b>	Potential injury to the eyes	Serious injury
	<b>Material</b>	<b>Attention</b>	Potential damaging situation	Possibly damage to the product or environment
		<b>Note</b>	Tips for operators	No hazardous or damaging consequences
			Important or useful information	No hazardous or damaging consequences
	<b>Material</b>		Potential damaging situation	Possible damage to the product



Specially emphasized paragraphs in this manual warn of danger or draw attention to important information. These paragraphs and their associated symbols include:

**When used with the signal words, Danger or Warning, this symbol warns of a dangerous situation that threatens personnel with serious injury or death.**

**When used with the signal word Caution, the symbol warns of a hazardous situation that could result in minor injury.**

**The danger exists of a fatal electric shock. At places designated with this symbol, electrical current can be present even after an Emergency Stop or after switching off the main switch. Before starting any work, always confirm that all electrical connections are free of electrical current.**

**Laser Warning symbol, the danger exists of an eye injury. At places designated with this symbol, use proper caution and do not look directly at the laser beam.**

**This symbol means that specific regulations, rules, notices, and working procedures must be observed. Ignoring this symbol can lead to equipment damage or destruction or to other property damage.**

**This symbol draws attention to user tips. No dangerous or damaging consequences for personnel or property are associated with this symbol.**

**This symbol indicates useful information. No dangerous or damaging consequences for personnel or property are associated with this symbol.**


**This symbol indicates that proper grounding is required to prevent damage to electronic components. No dangerous or damaging consequences for personnel are associated with this symbol.**

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## Area of Application

The information in this document applies to the entire Scalar 1000 library. Additional safety instructions for components used in the equipment are not invalidated by these instructions.

 **Note**  
Other manufacturers' documentation forms an integral part of the Scalar 1000 documentation.

This *manual* is intended for training personnel for service work and maintenance work. Therefore, the hazard alert messages apply only to maintenance of the equipment. Knowledge of safety rules for work on electronic and mechanical systems is required. Only trained specialists (maintenance trained) are allowed to maintain and repair the Scalar 1000 library.

## Guards

The Scalar 1000 library system is equipped with the following guards:

- Access Control
- Main Switch

## Access to the Library

The Scalar 1000 is completely enclosed in a housing. The only access is provided by the monitored guard door(s). The interlock is active when the Main Switch is switched ON.

The housing around the Scalar 1000 serves as a separating guard. It separates the danger area of the Scalar 1000 system from the normal working area.

The danger area of the Scalar 1000 system is the area in which persons could be injured because of hazardous movements of the handling unit.

Hazardous movements can be:

- Expected movements
- Unexpected movements

The guard door can be opened from the outside only with a key. An authorized person is responsible for this key.



**In the Scalar 1000, movements of components can cause serious injury.**

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Access to this area is, therefore, restricted to authorized persons. Persons who are not trained in the use of the system should enter the Library only under supervision.

Access to the library is permitted only:

- After switching OFF the Main Circuit Breaker
- Disconnecting from the main power source

Unauthorized persons are especially at risk in the danger area because they:

- Are not trained in operating the system
- Are not aware of the hazards
- Cannot correctly appraise the reactions of the system




## Main Switch

Before entering the Scalar 1000 or working with electrical components, ensure that the Main Circuit Breaker is OFF.

## Before Working on Equipment



 **Note**  
Bridging of door guards is not advisable.

Before beginning work, become familiar with the location of the:

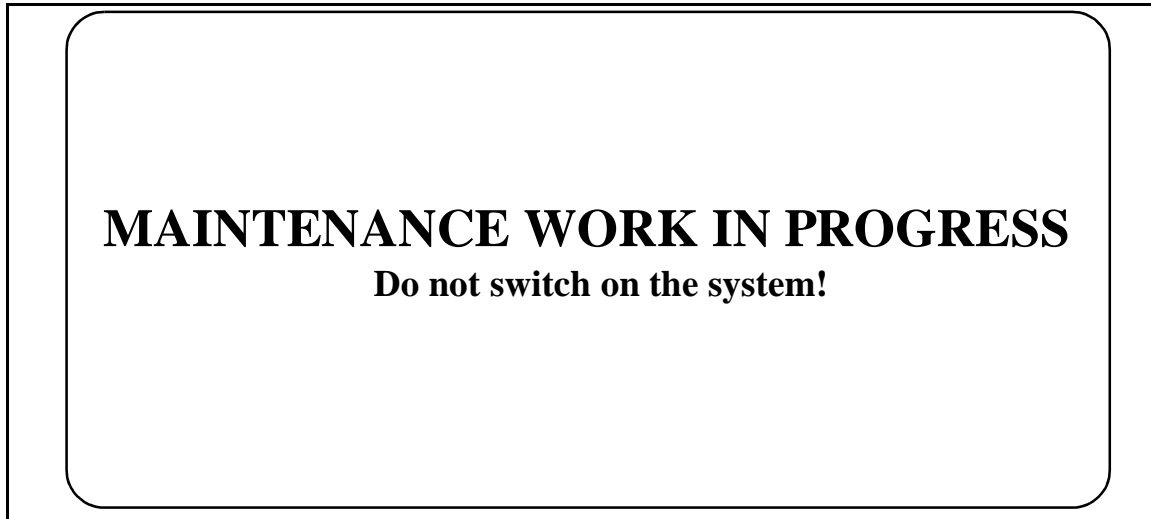
- Circuit Breaker
- Power source connection

**Never put door guards out of operation other than as instructed by supervision.**

- Before beginning maintenance or repair work, switch the Scalar 1000 library system OFF with the **Main** switch.

All drive units and all hazardous voltages are switched OFF.

Place a yellow sign onto the system. See Figure 3-1.



**Figure 3-1** Warning Sign

Proceed with extreme caution if the system cannot be switched off at the main switch because of required work (for example, functional checks).

## Normal Operating Modes

In normal operation, the host controls the Scalar 1000.

## Emergency Operating Mode

Emergency operations are meant for:

- Manual inserts and retrievals of media
- Manual operation of the drives

### Caution

**When the guard door(s) open, system operation is interrupted. Operation resumes when the guard door(s) close. Ensure that no hazards exist before closing the guard door(s).**

## Before Restarting Equipment

### Caution

**Movement of components inside the library can cause serious injury. Before starting the Scalar 1000 library, ensure that no personnel are inside the library.**



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## Working on Live Parts

Contact with live electrical parts can cause severe or fatal burns and internal injury as the consequence of electrical shock. After contact with live parts, persons often cannot break loose from the part by themselves. A second person must stand near the Main Circuit Breaker to be able to switch it OFF immediately in a hazardous situation.

Components being worked on must be live only when this is specifically required.

Before working on other electrical components, switch OFF power with the Main switch.



Never assume a circuit is without power - always check the circuit.

Work on live parts of the equipment must be authorized by supervision.

When performing such work, observe the following:

- Accident prevention rules
- Perform the following:
  - Use only suitable tools and measuring devices in good working condition.
  - Check the measuring devices for correct adjustment of measuring ranges.
  - Work with one hand only. This can prevent injury to internal organs in case of electrical shock.
  - Avoid contact with conducting floors (especially metal) or equipment parts. If necessary, cover the working area with suitable protective rubber mats.

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## Mechanical Maintenance

Observe the following:

- Location of the escape routes and emergency exits - keep these free of obstacles
- Keep dismounted machine components and other parts safe and inaccessible for unauthorized persons
- Keep the equipment clean during work; clean up carefully afterward

Before and after work, remove and reinstall all safety provisions installed for maintenance, such as:

- Covers
- Hazard alert messages
- Warning signs
- Grounding wires

Clothing must be in agreement with the safety rules. Clothing:

- Must not have metal fasteners
- Should be close-fitting so that it cannot be caught in moving machine parts
- Button up or roll up the sleeves.
- Place the ends of a scarf into the clothing.
- For long hair, use a protection that fully covers it.
- Take off watch, rings, jewelry, etc.

Wear safety glasses when:

- Using a hammer
- Using an electric drill
- Working on springs, retaining rings etc.
- Soldering, working on cables
- Cleaning with chemical agents
- All work that endangers the eyes

When handling heavy components, wear safety shoes.



**Refrain from any action that could endanger persons or that could damage installations or equipment.**



## Safety Check

Check all guards every 6 months:

- Door interlocks
  - Scalar 1000 access

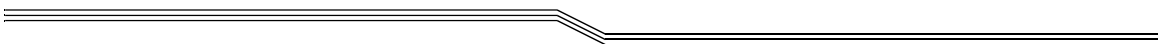
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# 4

## Panel

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Operator/CE Panel Flowcharts .....	4-8



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## Overview

The Operator/CE panel provides a menu-driven operator and service interface via an assembly that consists of a message display, push-button switches and LED indicators. Displays include operator and service menus, library and drive status, activities, error condition and help text. English is the only language supported.



**Important Note:** This chapter is designed to provide the reader with:

- an overview of the Operator Panel
- information on how to navigate through the Operator Panel Menus
- an overview of all menu functions





Refer to the **Scalar 1000 Operator Guide** for the complete descriptions of all functions available. The Operator Guide is updated with each release of the Scalar 1000 firmware, make sure you have the proper level of this document to use with the Firmware installed.

The Panel consists of an LCD which is capable of displaying 20 characters by 4 lines at a time, six push-button switches and 3 LED indicators. Each push-button is represented by a graphic icon. The push-buttons and indicators are as follows:


**Table 4-1** Button Indicators

Push button	Description
	<p>The <b>Up Arrow</b> button can be used to:</p> <ul style="list-style-type: none"><li>• scroll the display to show previous line(s)</li><li>• move the cursor to an item previous of the current item when selecting an option, selection is represented by the character "&gt;"</li><li>• increment the current value to the next value when used in an entry field</li></ul>
	<p>The <b>Down Arrow</b> button can be used to:</p> <ul style="list-style-type: none"><li>• scroll the display to show next line(s)</li><li>• move the cursor to an item after the current item when selecting an option, selection is represented by the character "&gt;"</li><li>• decrement the current value to the previous value when used in an entry field</li></ul>

**Table 4-1** Button Indicators

Push button	Description
	The <b>Enter</b> button can be used to: <ul style="list-style-type: none"><li>• select the current option as the next action to be performed by the library, the selected option will be preceded by the character "&gt;"</li><li>• act as a TAB key to the next required entry field when a multiple field entry is being entered such as time or date. In this case, the button will cycle through all the entry locations until the "<b>Accept</b>" option is chosen (with entry "Y").</li></ul>
	The <b>Escape</b> button can be used to: <ul style="list-style-type: none"><li>• leave the current display and return to the previous display if it exists.</li></ul>
	The <b>Help</b> button can be used to: <ul style="list-style-type: none"><li>• display help text for the current selected item if available. In this mode, the <b>Arrow</b> keys can be used to scroll through the help text and the <b>Escape</b> key is used to exit the help display.</li></ul>
	The <b>Ready</b> button can be used to: <ul style="list-style-type: none"><li>• put the Library in a state to accept motion commands from the hosts.</li></ul>



**Table 4-2** Panel Indicators

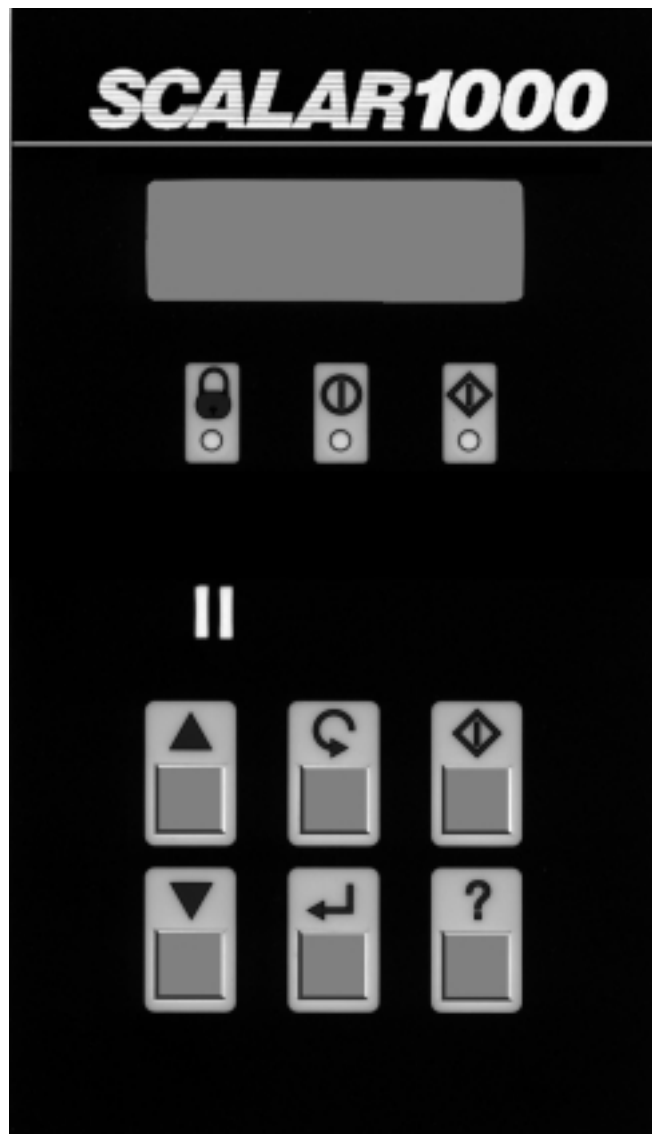
Indicator	Description
	The <b>Insert/Eject Station locked</b> indicator is lit whenever this facility is being used by the Library.

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**Table 4-2**      Panel Indicators

Indicator	Description
	The <b>Ready</b> indicator is lit whenever Power is available in the aisle and the Library is ready to perform motion commands from the host.
	The <b>Power On</b> indicator is lit whenever the Control Module is connected to an AC power source and both the switch and the Circuit Breaker on the AC Power Compartment are ON.



**Figure 4-1** Operator/CE panel

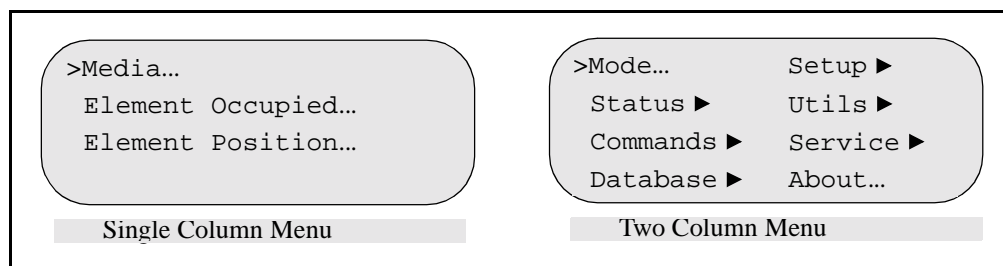
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## Operator/CE Panel Menus

The Operator/CE panel allows information to be passed from the Library to the Operator/CE and back to the Library. The Operator and CE communicates with the Library via menus presented on the message display.

All menus are available to both Operator and CE. The options within each menu are grouped according to their functions. The menus can be presented as one column of 4 lines by 20 characters or as two columns of 4 lines by 10 characters on the message display as shown in the following figure:

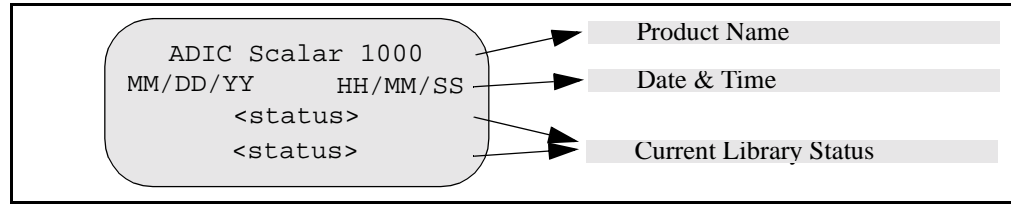


**Figure 4-2** Operator/CE Menu layouts

Each option in the menus may be preceded and/or followed by a symbol, the symbols and their meanings are:

- The symbol ">" preceding the option means the option is at the current selection. When this character is present, pressing the "Enter" button will select this option, pressing the "Help" button will display help text related to this option. The "Up" and "Down" button will move this character to the previous or next option.
- The symbol "..." following the option means further information will be presented in the next screen and the Operator or CE is required to interact with this information.
- The symbol "►" following the option means there is sub-menu for this option.
- The symbol "<" following the option means the option can be scrolled for different values.
- The symbol "^" below a character indicates that this character can be scrolled for different values. This is used in entering a password or Volume Serial number.

When the Scalar 1000 is powered On, the following screen will appear after successful completion of Firmware initialization:

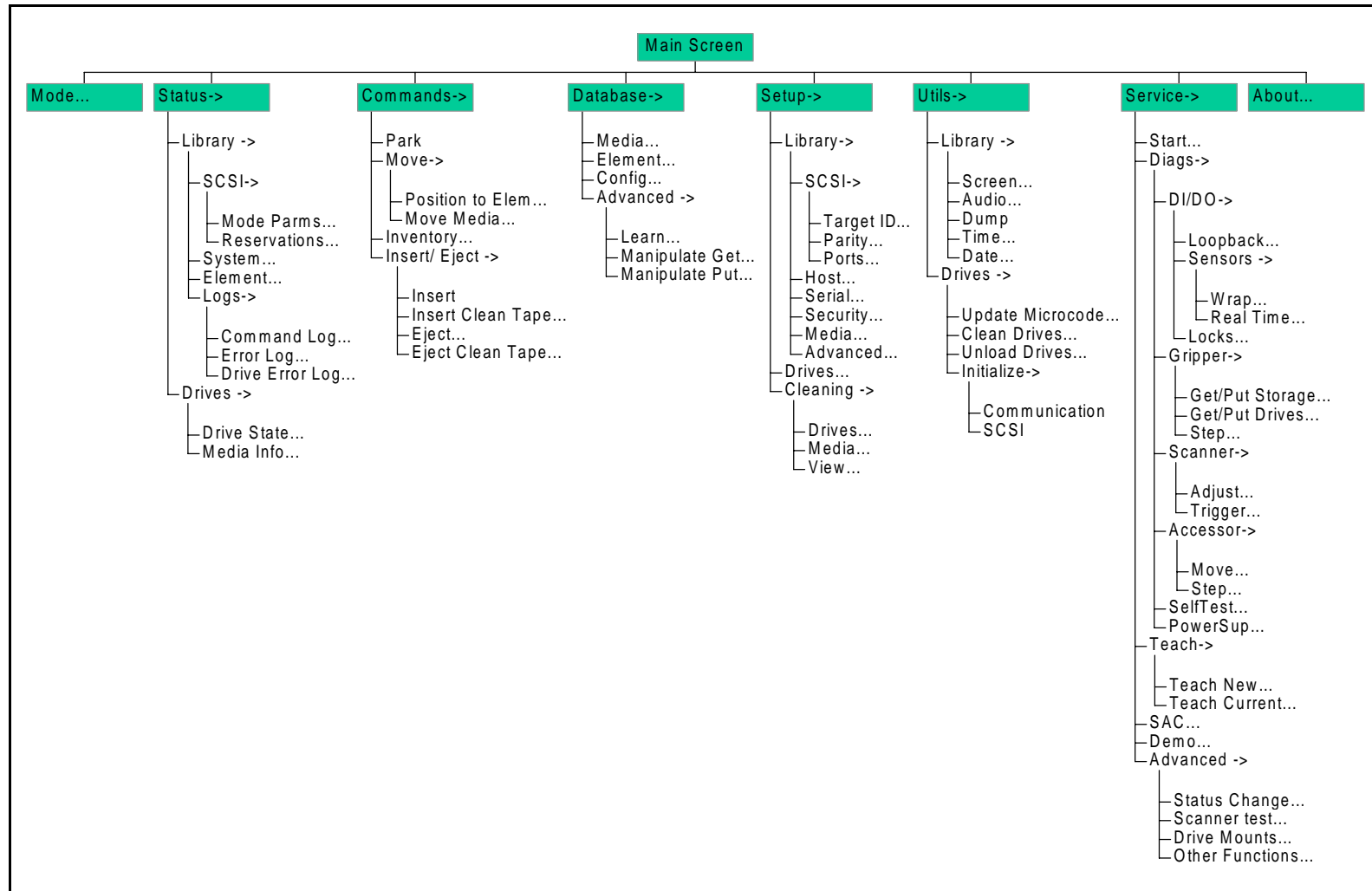


**Figure 4-3**      Scalar 1000 Initial Screen

## Operator/CE Panel Flowcharts

The following figures show all menus and functions available via the Operator/CE panel.

**NOTE: The menus shown in this version of the Maintenance Guide reflect Firmware Level 2.30 or higher, make sure this level of Firmware is loaded in your Library and refer to the Operator Guide for detail description of each menu option.**



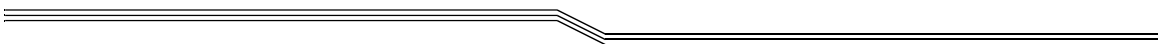
**Figure 4-4** Operator Panel Menu Tree for **Firmware Level 2.3 and higher**

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# 5

## Star

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## Overview

This chapter provides procedures to be used by the Field Engineer for all Service actions.

## Maintenance Starting Point

### Library Service Approach

Begin all maintenance action here. Start at the top of each table. Locate the reason you are here in the left column and perform the action in the right column.

- Step 1**    **Use** the Start Service on page 5-5 to determine the service action to perform and the Prepare for Service on page 5-4 to prepare the library for service. The symptoms and actions are listed in order of priority.
- Step 2**    **Follow** the recommended service procedure until a list of possible FRUs is recommended for the problem.
- Step 3**    **Review** the FRU list, ensure that all associated cards and cables are properly seated, and inspect mechanical assemblies for obvious damage before ordering or replacing FRUs.
- Step 4**    **Replace** recommended FRUs in the order specified. If a FRU does not correct the problem, re-install the original FRU and return the new FRU to stock.

#### **Note**

If a problem is fixed by reseating a cable or card, enter a specific comment in the field tracking system.



**Replace mechanical assemblies only if you detect obvious damage and power supplies if you have no DC output.**

**Always retest the Library after replacing a mechanical assembly. Perform this operation using the Operator Panel (Main Menu >Service >Teach >Teach New).**

 **Note**

If the problem is intermittent and will not fail, replacement of the FRU Group (minus the mechanical assemblies) may be appropriate. Based on the severity of the problem and customer input, determine the correct action to take.

**Step 5**    **Verify** that the library is functioning correctly.

**Step 6**    **Return** the library to customer use.

 **Prepare for Service**

The purpose of this procedure is to ensure that the impact of a service call to the customer is minimized. Review this procedure before performing any service that requires access to the library subsystem aisle, or when power must be removed from the library subsystem or from a tape drive.

**Table 5-1**    Prepare for Service

Task to be done	Perform this Action
<b>Concurrent Maintenance is not possible</b>	
<ul style="list-style-type: none"><li>• <b>One of the library electronic cards needs to be replaced.</b></li><li>• <b>Start service call or verify repair.</b></li><li>• <b>Tape drive problem and another tape drive is NOT available.</b></li></ul>	<ol style="list-style-type: none"><li>1. Ask the operator to complete or cancel jobs in the queue.</li><li>2. Ask the operator to vary all library devices off-line.</li><li>3. Place the library in <b>Offline</b> and <b>Not Ready</b> states by using the operator panel (Main Menu &gt;Mode).</li><li>4. Remove the cartridges left in the drives and place them in any empty storage cells.</li><li>5. When you are ready to replace Library FRUs, use the <b>Circuit Breaker</b> on the AC Power Compartment to power the library down (if possible, unload cartridges from drives before doing this).</li><li>6. Place the tape drive in service position (use Procedure on page 8-16, 8-17, 8-18, 8-19 or 8-20 depending on the drive type).</li><li>7. If this is a tape drive problem, go to the specific tape drive maintenance package.</li></ol>
<b>Accessor problems.</b>	<ol style="list-style-type: none"><li>1. Remove power to the +24V and +48V DC power supplies by turning Off the switch on the AC Power Compartment (refer to Figure 7-31 on page 7-27).</li><li>2. Make necessary repair.</li><li>3. Restore power to the +24V and +48V DC power supplies by turning the switch on the AC Power Compartment to the On position.</li></ol>
<b>Concurrent Maintenance is possible</b>	
<b>Tape drive problem. Another tape drive is available.</b>	<ol style="list-style-type: none"><li>1. Ask the operator to vary the failing device off-line.</li><li>2. Place the tape drive in service position.</li><li>3. Remove the cartridge left in failing drive and place it in any empty storage cell.</li><li>4. Go to the Tape Drive Maintenance Package.</li></ol>

## Start Service

Use the following table to start your service call.

**Table 5-2** Start Service

If ...	Perform this Action
<p><b>A +24V or +48V DC power indicator is NOT On.</b>  The indicator for the +24V DC power supply is located on the LMC card (refer to <b>Figure 7-17 on page 7-19</b> or <b>Figure 7-18 on page 7-20</b>); the indicator for the +48V DC power supply can be found on both power amplifiers (refer to <b>Figure 7-28 on page 7-25</b>). <b>Check Power</b> before proceeding with any library maintenance (refer to <i>Power Supplies Check Procedure</i> on page 8-73).</p>	<p>Go to Procedure <i>Analyze Power Problems in the Scalar 1000</i> on page 5-8.</p>
<p><b>Library subsystem power problem -</b> (includes library and tape drives).</p>	<p>Go to Procedure <i>Analyze Power Problems in the Scalar 1000</i> on page 5-8.</p>
<p><b>Library does not respond to commands.</b></p>	<ol style="list-style-type: none"> <li>1. Ensure the Scalar 1000 SCSI ID is set properly.</li> <li>2. Ensure the SCSI Bus is properly terminated.</li> <li>3. Check Scalar 1000 for proper SCSI Tem. power.</li> <li>4. Go to Procedure <i>LSC (SCSI and Control) Card</i> on page 8-56 to replace the LSC card.</li> </ol>
<p><b>The Library firmware does not complete the boot-up process and appears hung.</b>  There are two indicators for this condition: One is the display on the Op panel is not back lit and there are two faint dark lines appearing on it and the Power On LED on the Op panel is ON; the other indicator is to observe the LEDs on the LSC card, if either or both LEDs number 2 and 3 are On, the Library is in a hung state (refer to Figure 7-16 on page 7-18).</p>	<ol style="list-style-type: none"> <li>1. Power Off the Library Control Module and wait at least one minute before Power On to recover the problem.</li> <li>2. Go to Procedure <i>LSC (SCSI and Control) Card</i> on page 8-56 to replace the LSC card.</li> </ol>

**Table 5-2** Start Service

If ...	Perform this Action
<b>Library Interface problem with Host.</b>	<ol style="list-style-type: none"> <li>1. Check to make sure that the SCSI IDs are set correctly and there are no conflicting IDs on the same bus.</li> <li>2. Check to make sure that the proper SCSI terminator is installed (for example:LVD terminator installed with anLVD SCSI Bus, etc.).</li> <li>3. Check the SCSI cable to make sure that its length does not exceed the allowable limit.</li> <li>4. Check to make sure that the SCSTerm Power is set correctly (refer to Figure 7-24 on page 7-23).</li> <li>5. Go to Procedure <i>LDF1, LVD1 or LSE1 (SCSI Adapter) Card</i> on page 8-57 to replace the LSE1/LDF1/LVD1 cards.</li> <li>6. Go to Procedure <i>LSC (SCSI and Control) Card</i> on page 8-56 to replace the LSC card.</li> <li>7. If the above actions do not fix the problem, the problem is in the SCSI terminator, SCSI cables or the host initiator.</li> </ol>
<b>Service Action Code message from the Operator panel or from the Host.</b> Run Start option from the Operator Panel to retrieve the Service Action Code (Main Menu >Service >Start)	<ol style="list-style-type: none"> <li>1. Prepare Library for Service.</li> <li>2. Refer to Service Action Codes on page 6-3 and perform the actions in the order recommended.</li> </ol>
<b>Excessive retries on one section of the storage array or the cartridges are not fully inserted in the storage cells.</b>	<ol style="list-style-type: none"> <li>1. Prepare Library for Service.</li> <li>2. Run Get/Put Diagnostic from the Operator panel (&gt;Main Menu&gt;Service&gt;Diags&gt;Gripper&gt;Get/Put) to verify that the retries are excessive. The Gripper should get and put the cartridge cleanly into the storage cell but if it bumps into an upper or lower cartridge during this operation, retries are considered excessive. Note the storage array where this happens then perform Procedure <i>Accessor Alignment</i> on page 8-37, if this action does not fix the problem, replace the storage array using the procedure on page 8-54.</li> </ol>
<b>Library Problem - No Error Message</b> (includes visual symptoms or noise from the accessor)	<ol style="list-style-type: none"> <li>1. Prepare Library for Service.</li> <li>2. Go to Procedure <i>Other Library Failures</i> on page 5-11 to analyze the problem.</li> </ol>

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**Table 5-2**      Start Service

If ...	Perform this Action
<b>Tape Drive Problem</b>	<ol style="list-style-type: none"><li>1. Prepare Library for Service.</li><li>2. Put Tape drive in Service position using procedures on page 8-16, 8-17, 8-18, 8-19 or 8-20 depending on the drive type.</li><li>3. Go to specific Tape Drive Maintenance package.</li></ol>
<b>Install the Scalar 1000</b>	Go to Procedure <i>Installation</i> on page 11-3.
<b>Update Microcode</b>	Go to Procedure <i>Updating Microcode</i> on page 8-74.
<b>Retrieving Error log, Trace data and Microcode Dump</b>	Go to Procedure <i>Retrieving Error log, Trace data and Microcode Dump</i> on page 8-76.
<b>Perform Preventive Maintenance</b>	Go to Procedure <i>Preventive Maintenance</i> on page 8-71.



# Analyze Power Problems in the Scalar 1000

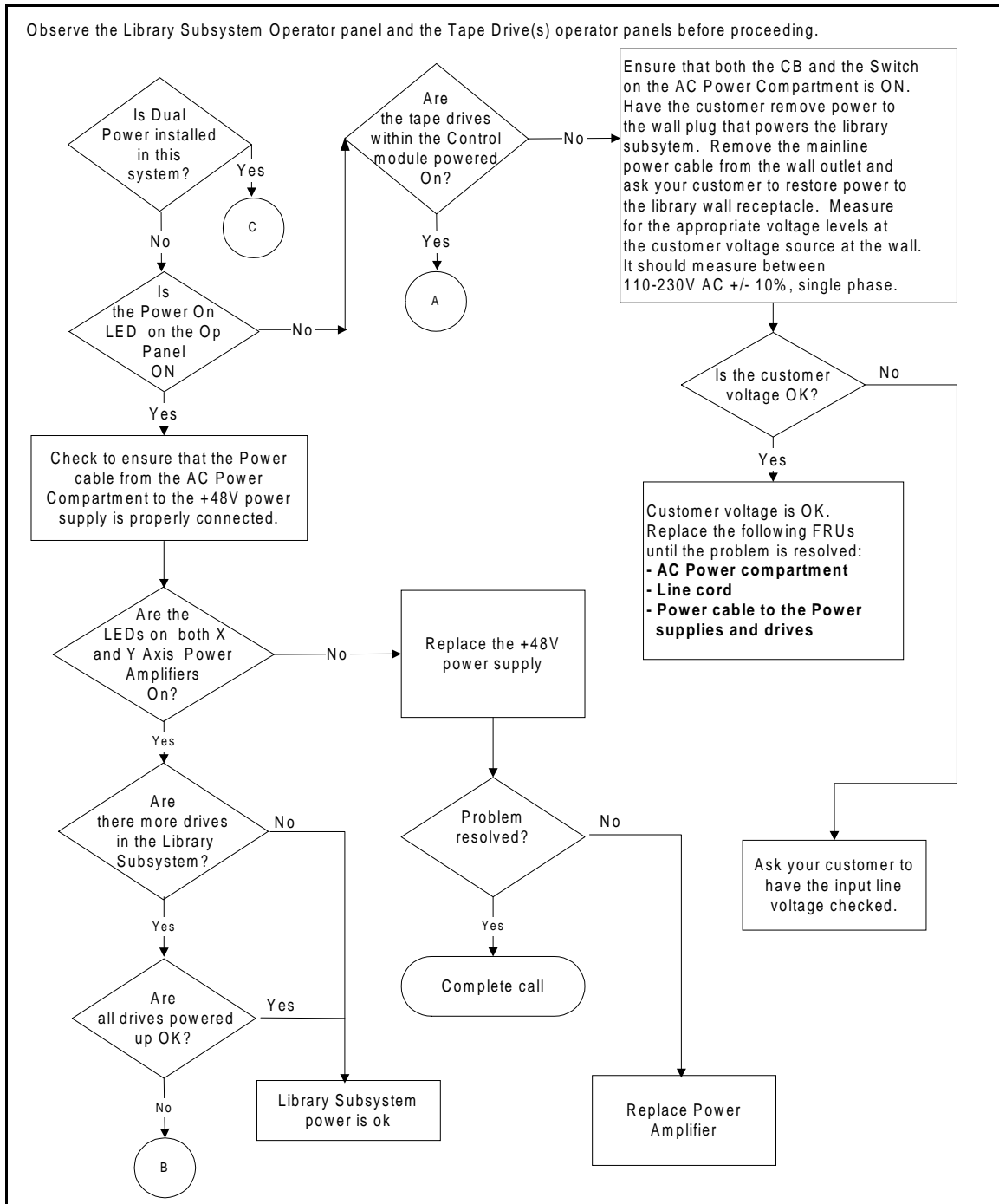
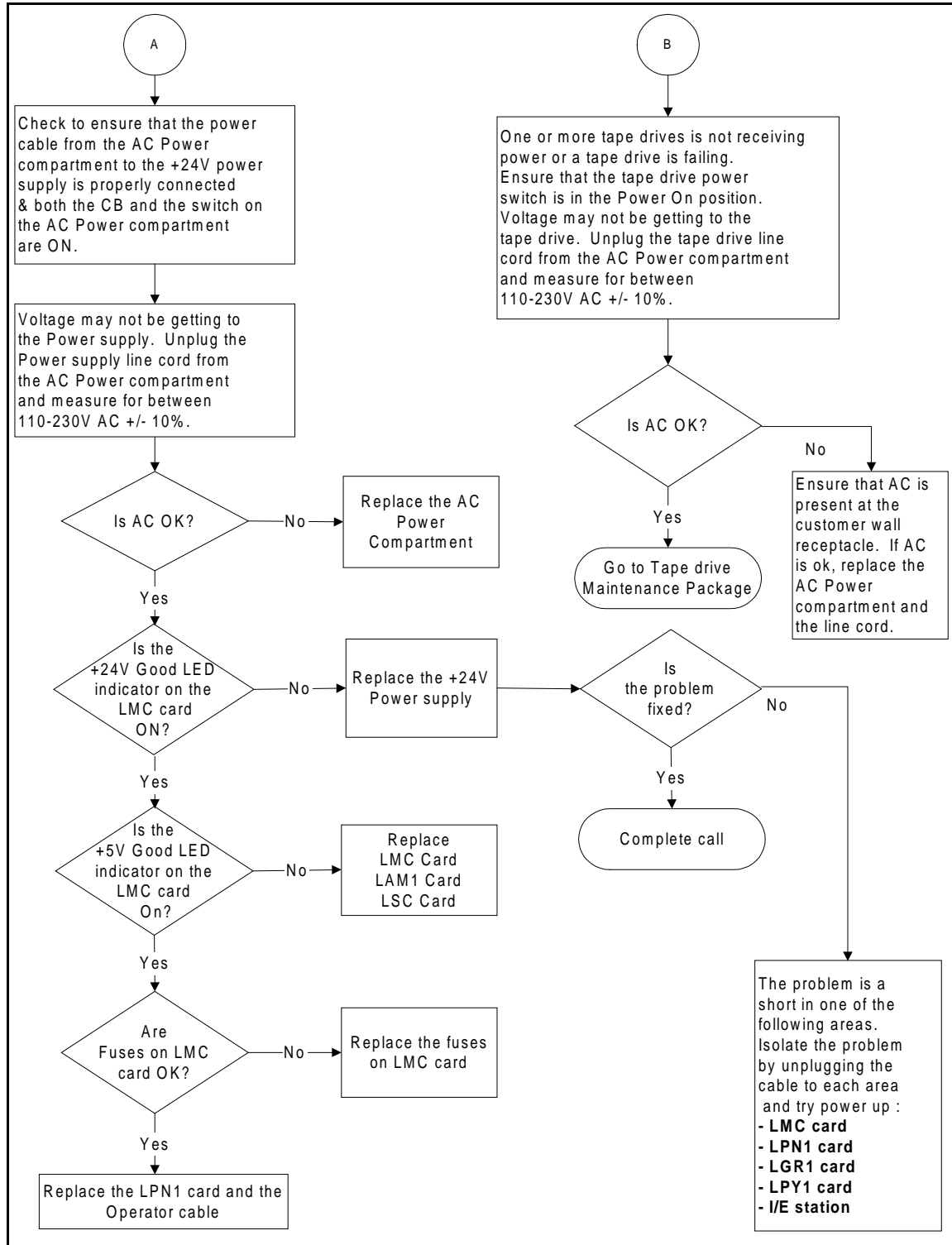


Figure 5-1 Power Map Page 1



**Figure 5-2** Power Map Page 2

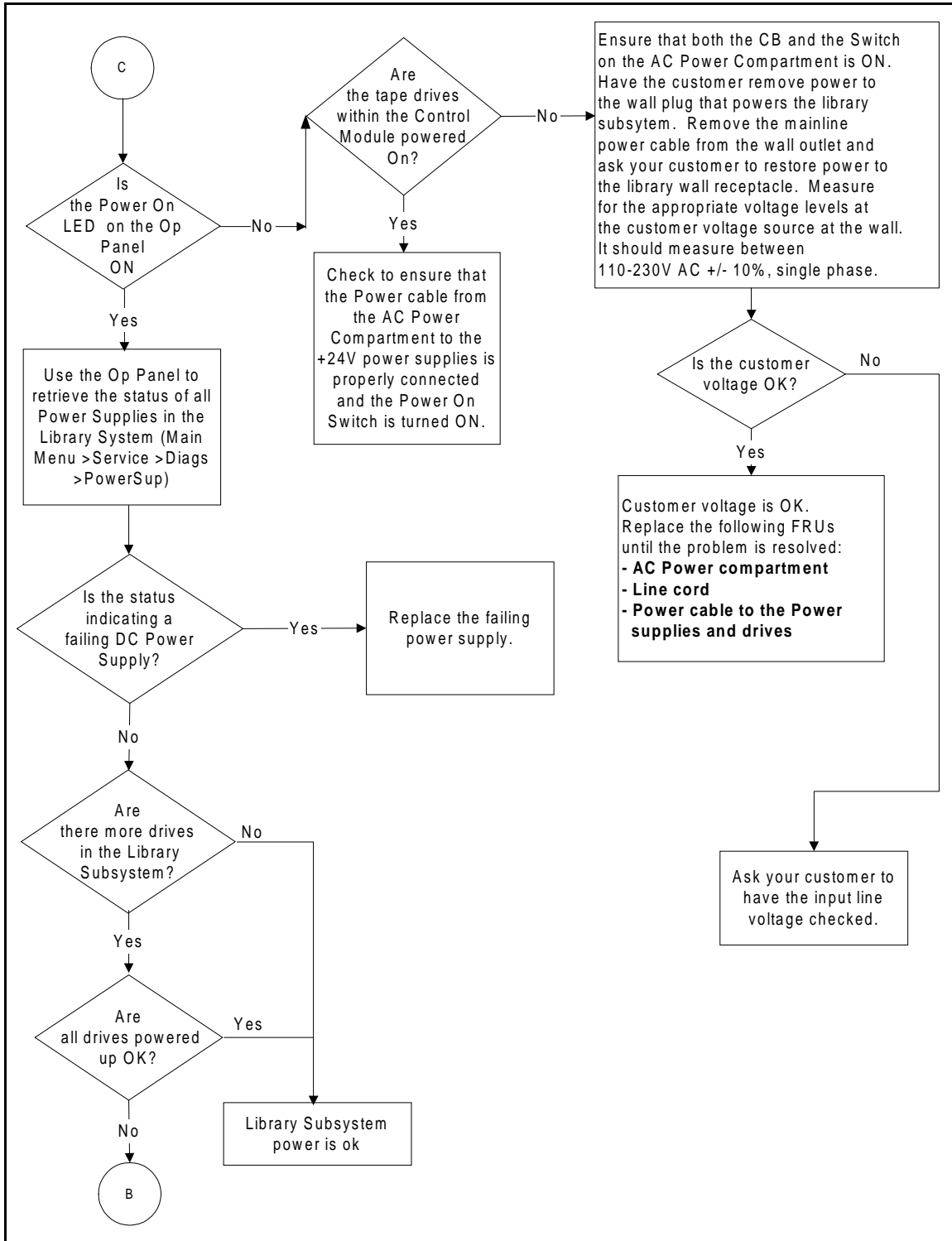


Figure 5-3 Power Map Page 3



## Other Library Failures

Use the following table to perform problem analysis for Library failures that appear as Visual, Audible, or other Symptoms without Service Action Codes (SACs).

**Table 5-3** Problem Analysis for Failures without Service Action Codes

Symptom	Possible Causes	Actions or FRUs	FRU ID	Reference Information on Page
Bearing noise or squeak from X-Axis or loose X-Axis belt(s).	Defective bearing	<ul style="list-style-type: none"><li>• Perform PM Procedure</li><li>• Replace X rail roller</li><li>• Replace X-Axis belt</li><li>• Replace X-Axis motor</li></ul>	76 81-84 40	8-71 8-44 8-35 8-43
Binding X-Axis	Guide roller adjustment or defective bearing	<ul style="list-style-type: none"><li>• Check top guide roller adjustment</li><li>• X-Axis belt</li><li>• X rail roller</li><li>• X-Axis motor</li></ul>	81-84 76 40	8-35 8-44 8-43
Binding in Y-Axis or noise/squeak from Y-Axis	Defective bearing	<ul style="list-style-type: none"><li>• Perform PM procedure</li><li>• Y-Axis rail roller</li><li>• Y-Axis motor</li></ul>	72 41	8-71 8-51 8-53
X or Y axis vibration (oscillation) when stopping or stopped	Servo problem	<ul style="list-style-type: none"><li>• X or Y power amplifiers</li><li>• X-axis motor</li><li>• Y-axis motor</li></ul>	52-53 40 41	8-61 8-43 8-53
Fuse(s) blown on LMC card	Shorted component or heavy load on circuit	Replace the fuse and power the library up. If the fuse continues to blow, go to Figure 9-2 on page 9-5 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.		9-5

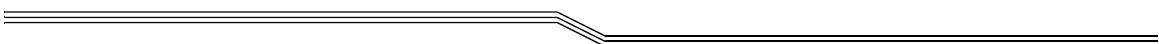
**Table 5-3** Problem Analysis for Failures without Service Action Codes

Symptom	Possible Causes	Actions or FRUs	FRU ID	Reference Information on Page
Insert/Eject station problem	Insert/Eject station mechanical or electronic failure	• Insert/Eject Station Locked Assembly	20	8-64
		• Insert/Eject Station cable	A0	8-64
		• Insert/Eject Station door closed sensor	31	
		• LPN1 card	12	8-58
		• LMC card	11	8-57
		• I/E station cable	A0	
Operator panel LEDs and display - incorrect operation	Operator panel electronic failure	• LPN1 card	12	8-58
		• LMC card	11	8-57
		• Op panel cable	A1	
Operator panel switches - incorrect operation	Operator panel electronic failure	• LPN1 card	12	8-58
		• LMC card	11	8-57
		• Op panel cable	A1	
Operator panel - No indicators are working	<ul style="list-style-type: none"> <li>+5VDC voltage missing from operator panel</li> <li>Barcode scanner shorting +12V</li> </ul>	• +24V DC Power Supply	51	8-67
		• LMC card	11	8-57
		• LPN1 card	12	8-58
		• Barcode scanner	55	8-21
		• Op panel cable	A1	
Operator panel - One or more indicators fail to light. Power is OK	<ul style="list-style-type: none"> <li>Indicator failing</li> <li>Driver failing</li> </ul>	• LPN1 card	12	8-58
		• LMC card	11	8-57
		• Operator Panel Cable	A1	
Operator panel - One or more indicators On. Should be Off	• Driver failing	• LPN1 card	12	8-58
		• LMC card	11	8-57

# 6

## Service Action Codes

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Service Action Codes .....	6-3



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## Overview

When a failure occurs, the Scalar 1000 firmware performs error recovery and error reporting. If the failure requires a service call, a one-byte Service Action Code (SAC) is generated and presented on the Operator/CE panel. This Service Action Code is the result of the Scalar 1000 firmware analyzing all pertinent information available at the time of failure which include sense data, the operation in progress, error and threshold data and any data returned from diagnostic routines invoked by the firmware to isolate the failure.

## Service Action Codes

Table 6-1 lists the codes and the actions that can be performed in addition to the FRUs that can be replaced. The table also contains the FRU names (each FRU is represented by a one-byte FRU identifier (FRU ID)) and a reference column which points to the page containing the location of the part or the procedure on how to perform the suggested action. **Always perform the actions in the order listed.**

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
01	Type 1 Software errors including Microcode and Operating System errors.		
		Retrieve the current Microcode dump.	8-76
		Power Off and On the Scalar 1000 Control Module to recover from the error. Use the Power Supplies Switch to perform this action, wait at least one minute between power Off and On.	7-27

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
02	<b>Type 2 Software errors including Microcode and Operating System errors.</b>		
		Force a Microcode Dump and retrieve it.	8-77
		Power Off and On the Scalar 1000 Control Module to recover from the error. Use the Power Supplies Switch to perform this action, wait at least one minute between power Off and On.	7-27
03	<b>Type 3 Software errors including Microcode and Operating System errors.</b>		
		Retrieve the current Microcode dump.	8-76
		Force another Microcode Dump and retrieve it.	8-77
		Power Off and On the Scalar 1000 Control Module to recover from the error. Use the Power Supplies Switch to perform this action, wait at least one minute between power Off and On.	7-27
04	<b>Type 4 Software errors including Microcode and Operating System errors (the errors are not mapped).</b>		
		Retrieve the current Microcode dump.	8-76
		Force another Microcode Dump and retrieve it.	8-77
		Power Off and On the Scalar 1000 Control Module to recover from the error. Use the Power Supplies Switch to perform this action, wait at least one minute between power Off and On.	7-27
05	<b>A permanent Software error occurred.</b>		
		Power Off and On the Scalar 1000 Control Module to recover from the error. Use the Power Supplies Switch to perform this action, wait at least one minute between power Off and On.	7-27
	10	Replace Library SCSI and Control (LSC) card.	8-56

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>10</b>	<b>Barcode scanner communications failed.</b>		
		Power Off and On the Scalar 1000 Control Module to recover from the error. Use the Power Supplies Switch to perform this action, wait at least one minute between power Off and On.	7-27
		Check the Power On LED on the Barcode scanner (this is the Red LED that can be seen without taking the Gripper cover off).  If this LED is <b>NOT</b> On, verify that power is present on the LGR1 card by running the gripper test using the Operator Panel (Main Menu >Service >Diags >Gripper).  If the gripper test is OK: <ul style="list-style-type: none"> <li>• Replace the LGR1 card.</li> </ul>	8-77
	13	• Replace the Barcode Scanner.	8-32
	55	If the gripper test failed: <ul style="list-style-type: none"> <li>• Check the 7A fuse on the LMC card, replace the LMC card.</li> </ul>	8-21
	11	• Check the 7A fuse on the LMC card, replace the LMC card.	8-57
	A2, A3	• Check for loose X and Y axis cables.	10-3
		If the Barcode scanner Power On LED is On, run the scanner trigger test using the Operator Panel (Main Menu >Service >Diags >Scanner >Trigger).  If the Trigger test is OK: <ul style="list-style-type: none"> <li>• Replace the LMC card.</li> </ul>	
	11	If the Trigger test failed: <ul style="list-style-type: none"> <li>• Replace the Barcode Scanner.</li> </ul>	8-57
	55		8-21

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
11	<b>Barcode scanner communication is OK, data received from the Barcode scanner is bad.</b>		
	55	Replace Barcode scanner.	8-21
	A2	Replace X-axis moving cable.	8-41
	A3	Replace Y-axis cable.	8-50
	13	Replace Grip card (LGR1).	8-32
	15	Replace Y-axis card (LYP1).	8-60
	11	Replace LMC card.	8-57
	10	Replace Library Control (LSC) card.	8-56
	B6,B7	Replace X-axis fixed cables.	10-3
12	<b>Barcode scanner communication is OK, Barcode scanner reports that data is bad.</b>		
	55	Replace Barcode scanner.	8-21
		Retrieve the current Microcode dump.	8-76
13	<b>Cannot read Cartridge Barcode label.</b>		
		Check Cartridge label to ensure that it meets specifications and installed properly, look for the followings: <ul style="list-style-type: none"> <li>• damaged or dirty label.</li> <li>• too short (less than 5 characters) or too long (more than 16 characters) label.</li> </ul> The cell in question is displayed with the Service Action Code. Run Start Option from the Operator Panel to retrieve this information (Main Menu >Service >Start).	
		Ensure that scan beam is not obstructed.	
		Perform the Barcode scanner adjustment procedure.	8-22

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
14	<b>Cannot read the Serial Number label during a Teach operation.</b>		
		Check the Serial Number label to ensure that it is installed properly and not damaged or dirty. The Serial Number label is located on the lower right corner of the first 5x10 (5x15 for AIT) storage array in the Control Module. The Serial Number label contains a barcode and readable serial number such as “201100031”.	
		Run Accessor Test from the Operator Panel (Main Menu >Service >Diags >Accessor >Move) to position the Gripper Assembly in front of the Serial Number Label, then run the Barcode Scanner Trigger test (Main Menu >Service >Diags >Scanner >Trigger).  If the test is OK: <ul style="list-style-type: none"> <li>Perform the actions in Service Action Code “84”.</li> </ul> If the test fails: <ul style="list-style-type: none"> <li>Perform the actions in Service Action Code “11”.</li> </ul>	
15	<b>The Barcode scanner is not capable of fully supporting all different labels in a Mixed Media Library.</b>		
	55	Replace Barcode scanner with one at the latest Engineering Change (EC) level.	8-21
20	<b>Serial Port Connection failures.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
		Replace Serial Port cable between the Host system and the LSC card.	
		Problem is in the Host system.	
21	<b>NVRAM failures.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>22</b>	<b>Fail to communicate with the Operator Panel.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
	11	Check for a blown 2A fuse on the Library Machine Control (LMC) card and replace the LMC card.	8-57
	A1	Replace Operator Panel cable.	10-3
	12	Replace Operator Panel (LPN1) card.	8-58
<b>23</b>	<b>An unexpected interrupt is received.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
	11	Replace Library Machine Control (LMC) card.	8-57
<b>30</b>	<b>A fatal error is detected in SCSI Port 0.</b>		
		Verify that the SCSI bus connected to Library Port 0 is properly terminated and powered.	
		Verify that the Library SCSI Port 0 is properly configured by using the Operator panel (Main Menu >Setup >Library >SCSI >Ports).	
	10	Replace Library Control (LSC) card.	8-56
	14, 15	Replace the SCSI Adapter card in Port 0 (LSE1/LDF1/LVD1).	8-57
<b>31</b>	<b>A fatal error is detected in SCSI Port 1.</b>		
		Verify that the SCSI bus connected to Library Port 1 is properly terminated and powered.	
		Verify that the Library SCSI Port 1 is properly configured by using the Operator panel (Main Menu >Setup >Library >SCSI >Ports).	
	10	Replace Library Control (LSC) card.	8-56
	14, 15	Replace the SCSI Adapter card in Port 1 (LSE1/LDF1/LVD1).	8-57

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
32	<b>Wrong SCSI bus connection is detected. A Single Ended SCSI bus is connected to the Library Port 0 Differential Adapter.</b>		
		Verify that the Host SCSI bus is the same type as the Library SCSI Adapter card in Port 0.	7-17
33	<b>Wrong SCSI bus connection is detected. A Single Ended SCSI bus is connected to the Library Port 1 Differential Adapter.</b>		
		Verify that the Host SCSI bus is the same type as the Library SCSI Adapter card in Port 1.	7-17
34	<b>A general SCSI failure is detected.</b>		
		Verify that the SCSI host is working properly.	
35	<b>A fatal SCSI error is detected but the Port is unknown.</b>		
		Verify that the SCSI busses connected to both Library Ports (if applicable) are properly terminated and powered.	
		Verify that both Library SCSI Ports are properly configured (if applicable) by using the Operator panel (Main Menu >Setup >Library >SCSI >Ports).	
	10	Replace Library Control (LSC) card.	8-56
	14, 15	Replace the SCSI Adapter card in both ports (LSE1/LDF1/LVD1).	8-57
40	<b>The Library Aisle power cannot be enabled.</b>		
		Check the entire Library Interlock circuitry including Interlock switches.	
	17	Replace LBI card(s).	8-60
	AA,AB	Replace LBI cable(s).	10-3
	1C	Replace LBITerminator card.	7-22

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
41	<b>The Library Aisle power cannot be disabled, failures are detected in the Digital In/Digital Out (DI/DO) circuitries.</b>		
	11	Replace the Library Machine Control (LMC) card.	8-57
	10	Replace Library SCSI and Control (LSC) card.	8-56
42	<b>A wrong library configuration is detected, the data reporting the number of frames installed is different than expected.</b>		
		Check the entire Library Interlock circuitry including Interlock switches.	
	17	Replace LBI card(s).	8-60
	AA,AB	Replace LBI cable(s).	10-3
	1C	Check the LBI Terminator card by installing it on the LMC card and power up the Subsystem to see if the Library comes up in Service Mode.  If the Subsystem comes up in the Service Mode: • replace the LBI terminator card If it does not: • replace the LMC card.	8-57
43	<b>An unknown library configuration is detected, the barcode scanner is unable to read the fiducial label located on the 4x12 (4x18 AIT) or the 5x12 (5x18 AIT) storage array during a Teach operation.</b>		
		Ensure that the Microcode level in the Scalar 1000 supports the Hardware installed.	
		Check for a dirty,damaged, missing or wrong fiducial label located at the 4x12 (4x18 AIT) storage array in the Control Module or the fiducial label located at the 5x12 (5x18 AIT) storage array in the Expansion Module(s) (if present).	
		Replace the 4x12 (4x18 AIT) or the 5x12 (5x18 AIT) storage array.	8-54

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
44	<b>An unknown fiducial label is detected during a Teach operation.</b>		
		Ensure that the Microcode level in the Scalar 1000 is at the latest level.	
		Check for a dirty, damaged, missing or wrong fiducial label where the gripper is positioned.	
		Replace the storage array.	8-54
50	<b>A cartridge is not properly seated in the storage cell.</b>		
		Check to ensure that the cartridge in question is properly installed in its storage cell, the cells in question are displayed with the Service Action Code. Run Start Option from the Operator Panel to retrieve this information (Main Menu >Service >Start).	
		Check Cartridge label to ensure that it meets specifications and installed properly and not damaged or dirty.	
		Perform Procedure <i>Accessor Alignment</i> on page 8-37	
		Run Teach from the Operator/CE panel (Main Menu >Service >Teach >Teach New) and observe the scan beam when it moves across any fiducial label.	
	55	If the scan beam does not move all the way past the left edge of the fiducial barcode label, check that the label is clean and applied correctly then replace the Barcode scanner.	8-21
		Reteach the Library using the Operator panel (Main Menu >Service >Teach >Teach New).	
		Perform the Barcode scanner adjustment procedure.	8-22

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>60</b>	<b>Cannot complete the Lock/Unlock Insert/Eject station commands.</b>		
		Run Lock Diagnostics from the Operator panel to see if there is any mechanical bindings (Main Menu >Service >Diags >DI/DO >Locks).	
		Perform Power Supply check procedure.	8-73
		Check the 2A fuse on LMC card.	7-20
	20	Replace the I/E Station locked assembly	8-63
	A0	Replace the I/E Station cable.	10-3
	12	Replace Operator Panel (LPN1) card.	8-58
	11	Replace the Library Machine Control (LMC) card.	8-57
	10	Replace Library SCSI and Control (LSC) card.	8-56
	A1	Replace the Operator Panel cable.	10-3
<b>61</b>	<b>The Insert/Eject Station Closed Sensor error threshold is exceeded.</b>		
	31	Replace the I/E Station Closed Sensor	8-64
<b>70</b>	<b>Failures detected in the Gripper Assembly Finger Open operation.</b>		
	13	Replace Grip card (LGR1).	8-32
	70	Replace Gripper Assembly.	8-24
	A2	Replace X-axis moving cable.	8-41
	11	Check fuses on LMC card, replace LMC card.	8-57
	A3	Replace the Y-axis cable.	8-50
	10	Replace Library SCSI and Control (LSC) card.	8-56
	15	Replace the Y-axis card (LYP1).	8-60
	B6,B7	Replace the X-axis fixed cables.	10-3

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>71</b>	<b>Failures detected in the Gripper Assembly Finger Close operation.</b>		
		Reteach the current position using the Operator panel (Main Menu >Service >Teach >Teach Current).	8-30
	13	Replace Grip card (LGR1).	8-32
	70	Replace Gripper Assembly.	8-24
	A2	Replace X-axis moving cable.	8-41
	11	Check fuses on LMC card, replace LMC card.	8-57
	A3	Replace the Y-axis cable.	8-50
	10	Replace Library SCSI and Control (LSC) card.	8-56
	15	Replace the Y-axis card (LYP1).	8-60
	B6,B7	Replace the X-axis fixed cables.	10-3
<b>72</b>	<b>A Get command was issued but the sensor indicated that a cartridge is already present in the Gripper Assembly.</b>		
		<p>Look into the Gripper Assembly and see if a cartridge is present.</p> <p>If a cartridge is found:</p> <ul style="list-style-type: none"> <li>• Perform the actions in Service Action Code "02".</li> </ul> <p>If <b>no</b> cartridge is found in the Gripper Assembly:</p> <ul style="list-style-type: none"> <li>• Perform the actions in Service Action Code "73".</li> </ul>	

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
73	<b>Failures detected in the Gripper Assembly Touch Tip operation.</b>		
	13	Replace Grip card (LGR1).	8-32
	70	Replace Gripper Assembly.	8-24
	A2	Replace X-axis moving cable.	8-41
	11	Check fuses on LMC card, replace LMC card.	8-57
	A3	Replace the Y-axis cable.	8-50
	10	Replace Library SCSI and Control (LSC) card.	8-56
	15	Replace the Y-axis card (LYP1).	8-60
	B6,B7	Replace the X-axis fixed cables.	10-3
74	<b>A Get command was issued but the sensor indicated that the source location is empty.</b>		
		This error can be caused by a cartridge not fully inserted in the storage cell above the failing cell. Check to see if this condition exists, if it is, push the cartridge into its cell and re-inventory the Library (>Main Menu >Commands >Inventory)	
		Check the O-rings on the touch tip roller for deterioration and replace them if necessary.	8-33
		This error could also be caused by the Gripper not getting to its intended target due to a defective Y-belt. Locate the Gripper and compare its coordinates with the failing cell's coordinates posted with this SAC. Replace the Y-belt if they do not match.	8-48
		Look into the location (cell or drive) and see if a cartridge is present.  If a cartridge is found: • Perform the actions in Service Action Code "73".  If <b>no</b> cartridge is found in this location: • Perform the actions in Service Action Code "02".	

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
75	<b>A failure is detected in the Gripper Assembly.</b>		
	13	Replace Grip card (LGR1).	8-32
	70	Replace Gripper Assembly.	8-24
	A2	Replace X-axis moving cable.	8-41
	11	Check fuses on LMC card, replace LMC card.	8-57
	A3	Replace the Y-axis cable.	8-50
	10	Replace Library SCSI and Control (LSC) card.	8-56
	15	Replace the Y-axis card (LYP1).	8-60
	B6,B7	Replace the X-axis fixed cables.	10-3
76	<b>A Teach failure is caused by the accessor out of alignment condition.</b>		
		Perform Procedure <i>Accessor Alignment</i> on page 8-37.	8-37
77	<b>Failures detected in the Gripper Assembly during a Retract operation.</b>		
	13	Replace Grip card (LGR1).	8-32
	70	Replace Gripper Assembly.	8-24
	A2	Replace X-axis moving cable	8-41
	11	Check fuses on LMC card, replace LMC card.	8-57
	A3	Replace the Y-axis cable.	8-50
	10	Replace Library SCSI and Control (LSC) card.	8-56
	15	Replace the Y-axis card (LYP1).	8-60
	B6,B7	Replace the X-axis fixed cables.	10-3

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
78	<b>A Put command was issued but the sensor indicated that the cartridge is not present in the Gripper Assembly.</b>		
		<p>Look into the Gripper Assembly and see if a cartridge is present.</p> <p>If a cartridge is found:</p> <ul style="list-style-type: none"> <li>• Perform the actions in Service Action Code "73".</li> </ul> <p>If <b>no</b> cartridge is found in the Gripper Assembly:</p> <ul style="list-style-type: none"> <li>• Perform the actions in Service Action Code "02".</li> </ul>	
79	<b>Failures detected in putting a cartridge into a DLT tape drive.</b>		
		Check the DLTtape drive to ensure that it's powered On and working properly. Refer to the DLT Maintenance Manual for any DLT drive problem.	
		<p>Perform Procedure <i>Accessor Alignment</i> on page 8-37. Reteach the Library (Main Menu &gt; Service &gt; Teach &gt; Teach New).</p> <p>Make sure that a cartridge is in the drive but not loaded. Position the Gripper in front of the drive, manually extend the Gripper fingers out and check that the touch tip roller is centered on the cartridge. Continue with the following actions if the touch tip roller is not centered on the cartridge.</p>	8-37
	13	Replace Grip card (LGR1).	8-32
	70	Replace Gripper Assembly.	8-24
	A2	Replace X-axis moving cable.	8-41
	11	Check fuses on LMC card, replace LMC card.	8-57
	A3	Replace the Y-axis cable.	8-50
	10	Replace Library SCSI and Control (LSC) card.	8-56
	15	Replace the Y-axis card (LYP1).	8-60
	B6,B7	Replace the X-axis fixed cables.	10-3

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**Table 6-1**      Service Action Codes

<b>Reported SAC</b>	<b>FRU ID</b>	<b>Perform these actions</b>	<b>Reference Information on Page</b>
<b>7A</b>	<b>Failures detected in the Gripper Assembly Reach/Retract operations.</b>		
	13	Replace Grip card (LGR1).	8-32
	70	Replace Gripper Assembly.	8-24
	A2	Replace X-axis moving cable.	8-41
	11	Check fuses on LMC card, replace LMC card.	8-57
	A3	Replace the Y-axis cable.	8-50
	10	Replace Library SCSI and Control (LSC) card.	8-56
	15	Replace the Y-axis card (LYP1).	8-60
	B6,B7	Replace the X-axis fixed cables.	10-3

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
7B	<b>Failure detected in a Teach Master operation. This failure is most likely occurred when a Teach operation is executed as part of the Installation process or during machine power up.</b>		
		<p>Run Teach from the Operator/CE panel and observe the Teach Master portion of the Teach process (Main Menu &gt;Service &gt;Teach &gt;Teach New). During this phase, the roller right rod (located on the Gripper Assembly) is extended and pressed gently on the Teach Master Tab and the Gripper Assembly is moved slowly downward so that the Touch Tip sensor is activated, this move is then repeated but the Gripper Assembly is now moved sideways. Perform the following actions depending on your observation:</p> <p>If the gripper right rod is not extended to make contact with the Teach Master Tab:</p> <ul style="list-style-type: none"> <li>• Perform the actions in Service Action Code "7A".</li> </ul> <p>If the gripper right rod made full contact with the Teach Master Tab:</p> <ul style="list-style-type: none"> <li>• Perform the actions in Service Action Code "73".</li> </ul> <p>If the gripper right rod marginally made contact with or missed the Teach Master Tab completely:</p> <ul style="list-style-type: none"> <li>• Perform Procedure <i>Accessor Alignment</i> on page 8-37.</li> </ul>	
7C	<b>Failures detected in the Gripper Assembly Reach operation.</b>		
		Check for obstruction in the cell. Obstruction can be an unlabeled cartridge or a cartridge in the cell during a Put operation.	
		Perform Procedure <i>Accessor Alignment</i> on page 8-37.	8-37
		Perform the actions in Service Action Code "7A".	

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>7D</b>	<b>Failure detected while getting a cartridge from a Tape drive.</b>		
		<p>Check the Tape drive and see if a cartridge is present.</p> <p>If a cartridge is found in the Tape drive:</p> <ul style="list-style-type: none"> <li>Remove the cartridge from the tape drive and re-power the drive.</li> </ul> <p>If no cartridge is found in the Tape drive:</p> <ul style="list-style-type: none"> <li>Perform Procedure <i>Accessor Alignment</i> on page 8-37.</li> </ul>	
<b>80</b>	<b>Failures detected in the X-axis Servo system.</b>		
		Perform Power Supply check procedure.	8-73
		Perform Procedure <i>Accessor Alignment</i> on page 8-37.	8-37
		Check and replace the X-axis Power Amplifier Fuse (4A).	7-17
	13	Replace X-axis motor	8-24
	52	Replace X-axis Power Amplifier.	8-61
	1A	Replace Accessor Motion (LAM1) card.	8-61
	11	Check fuses on LMC card, replace LMC card.	8-57
	50	Replace the +48V DC Power Supply	8-68
	57	Replace Shunt Regulator.	8-69
	B6,B7	Replace X-axis fixed cables.	10-3
	AD,AE	Replace Power Amplifiers Power and Logic cables.	10-3
	B5	Replace +48V DC Power Supply Distribution cable.	10-3
	10	Replace Library SCSI and Control (LSC) card.	8-56

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>81</b>	<b>Failures detected in the Y-axis Servo system.</b>		
		Perform Power Supply check procedure.	8-73
		Perform Procedure <i>Accessor Alignment</i> on page 8-37.	8-37
		Check and replace the Y-axis Power Amplifier Fuse (4A).	7-17
	13	Replace Y-axis motor.	8-24
	52	Replace Y-axis Power Amplifier.	8-61
	1A	Replace Accessor Motion (LAM1) card.	8-61
	11	Check fuses on LMC card, replace LMC card.	8-57
	15	Replace the Y-axis card (LYP1).	8-60
	A2	Replace X-axis moving cable.	8-41
	50	Replace the +48V DC Power Supply.	8-68
	57	Replace Shunt Regulator.	8-69
	B6,B7	Replace X-axis fixed cables.	10-3
	AD,AE	Replace Power Amplifiers Power and Logic cables.	10-3
	B5	Replace +48V DC Power Supply Distribution cable.	10-3
	10	Replace Library SCSI and Control (LSC) card.	8-56
<b>82</b>	<b>An unexpected Motors Control condition was received.</b>		
	1A	Replace Accessor Motion (LAM1) card.	8-61
	10	Replace Library SCSI and Control (LSC) card.	8-56
	52	Replace X-axis Power Amplifier	8-61
	52	Replace Y-axis Power Amplifier.	8-61

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
83	<b>The Locate Fiducial Command failed with no target found. This failure happens most likely during an initial installation of the Library Subsystem.</b>		
		Check and clean all Teach Fiducial labels	
		<p>Run Teach New from the Operator panel (Main Menu &gt;Service &gt;Teach &gt;Teach New) and see if the scan beam is positioned directly in front of the label.</p> <p>If the scan beam is positioned correctly:</p> <ul style="list-style-type: none"> <li>• Perform Procedure <i>Adjusting the Barcode Scanner</i> on page 8-22.</li> </ul> <p>If the scan beam is not positioned correctly:</p> <ul style="list-style-type: none"> <li>• Perform Procedure <i>Accessor Alignment</i> on page 8-37.</li> </ul>	

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>84</b>	<b>Y-axis failed to reach target.</b>		
		Perform Power Supply check procedure.	8-73
		Check for mechanical binding in Y-axis: <ul style="list-style-type: none"> <li>• Ensure that all 4 wiper pads on the Y-axis rail roller are properly lubricated. <b>Do not excessively lubricate these pads.</b></li> <li>• Ensure that the Y-axis rail roller is not overly tightened to the Y-rail.</li> </ul>	8-51  8-39
	82	Replace Y-axis belt.	8-48
	41	Replace Y-axis motor.	8-24
		Check and replace the Y-axis Power Amplifier Fuse (4A).	7-17
	53	Replace Y-axis Power Amplifier.	8-61
	72	Replace accessor assembly (if obvious damage).	8-47
	37	Replace Y-axis home sensor.	8-49
	A2	Replace X-axis moving cable.	8-41
	11	Check fuses on LMC card, replace LMC card.	8-57
	A3	Replace the Y-axis cable.	8-50
	AD	Replace Power Amplifiers Power cable.	10-3
	A6	Replace Y-axis Motor cable.	10-3
	15	Replace the Y-axis card (LYP1).	8-60
	10	Replace Library SCSI and Control (LSC) card.	8-56
	B6,B7	Replace X-axis fixed cables.	10-3

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
85	<b>X-axis failed to reach target.</b>		
		Perform Power Supply check procedure.	8-73
		Check for mechanical binding in X-axis: <ul style="list-style-type: none"> <li>• Ensure that all 4 wiper pads on the X-axis rail roller are properly lubricated. <b>Do not excessively lubricate these pads.</b></li> <li>• Ensure that the X-axis rail roller is not overly tightened to the X-rail.</li> </ul>	8-44
	81	Replace X-axis belt.	8-35
	40	Replace X-axis motor	8-43
	36	Replace X-axis home sensor	8-42
		Check and replace the X-axis Power Amplifier Fuse (4A).	7-17
	52	Replace X-axis Power Amplifier.	8-61
	1A	Replace Accessor Motion (LAM1) card.	8-61
	76	Replace X-axis rail roller.	8-44
	A2	Replace X-axis moving cable.	8-41
	11	Check fuses on LMC card, replace LMC card.	8-57
	A4	Replace X-axis Motor cable.	10-3
	AD	Replace Power Amplifiers Power cable.	10-3
	71	Replace X-axis assembly in all modules (if obvious damage).	8-45
	15	Replace the Y-axis card (LYP1).	8-60
	10	Replace Library SCSI and Control (LSC) card.	8-56
	B6,B7	Replace X-axis fixed cables.	10-3

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
86	The first full speed move command issued when the accessor is at home position failed.		
		Perform Power Supply check procedure.	8-73
		Check for mechanical binding in both X and Y axis: <ul style="list-style-type: none"> <li>• Ensure that all wiper pads on the both axis rail rollers are properly lubricated. <b>Do not excessively lubricate these pads.</b></li> <li>• Ensure that the both axis rail rollers are not overly tightened to the rails.</li> </ul>	
		Press the Ready switch on the Operator panel and observe the accessor to see which axis (X or Y) fails to move: <p>If the <b>X</b>-axis fails to move:</p> <ul style="list-style-type: none"> <li>• Perform the actions in Service Action Code “80”.</li> </ul> <p>If the <b>Y</b>-axis fails to move:</p> <ul style="list-style-type: none"> <li>• Perform the actions in Service Action Code “81”.</li> </ul> <p>If <b>both</b> axes fail to move:</p> <ul style="list-style-type: none"> <li>• Replace the LAM1 card.</li> <li>• Replace the LMC card.</li> <li>• Replace the X-axis moving cable.</li> <li>• Replace the X-axis fixed cable.</li> <li>• Replace the 48V DC power supply</li> <li>• Replace both X and Y axis Power Amplifiers.</li> <li>• Replace the Shunt Regulator.</li> <li>• Replace the 48V DC Power cables.</li> <li>• Replace the LSC card.</li> </ul>	

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
87	<b>The accessor cannot move away from X-axis home position.</b>		
		Perform Power Supply check procedure.	8-73
	36	Replace X-axis home sensor	8-42
		Check and replace the X-axis Power Amplifier Fuse (4A).	7-17
	40	Replace X-axis motor	8-43
	52	Replace X-axis Power Amplifier.	8-61
	1A	Replace Accessor Motion (LAM1) card.	8-61
	11	Check fuses on LMC card, replace LMC card.	8-57
	50	Replace +48V DC Power Supply.	8-68
	57	Replace Shunt Regulator.	10-3
	B6,B7	Replace X-axis fixed cables.	10-3
	AD,AE	Replace Power Amplifiers Power and Logic cables.	10-3
	B5	Replace +48V DC Power Supply Distribution cable.	10-3
	10	Replace Library SCSI and Control (LSC) card.	8-56

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>88</b>	<b>The accessor cannot move away from Y-axis home position.</b>		
		Perform Power Supply check procedure.	8-73
	37	Replace Y-axis home sensor.	8-49
		Check and replace the Y-axis Power Amplifier Fuse (4A).	7-17
	41	Replace Y-axis motor.	8-24
	53	Replace Y-axis Power Amplifier.	8-61
	1A	Replace Accessor Motion (LAM1) card.	8-61
	11	Check fuses on LMC card, replace LMC card.	8-57
	15	Replace the Y-axis card (LYP1).	8-60
	A2	Replace X-axis moving cable.	8-41
	50	Replace +48V DC Power Supply.	8-68
	57	Replace Shunt Regulator.	10-3
	B6,B7	Replace X-axis fixed cables.	10-3
	AD,AE	Replace Power Amplifiers Power and Logic cables.	10-3
	B5	Replace +48V DC Power Supply Distribution cable.	10-3
	10	Replace Library SCSI and Control (LSC) card.	8-57
<b>90</b>	<b>An LSC1 card was detected by the Library firmware when an LSC2 card is required for this Library configuration to operate.</b>		
	10	Replace the LSC1 card with an LSC2 card.	8-56
<b>91</b>	<b>An LMC1 card was detected by the Library firmware when an LMC3 card is required for this Library configuration to operate.</b>		
	11	Replace the LMC1 card with an LMC3 card.	8-57
<b>92</b>	<b>An LBI1 card was detected by the Library firmware when an LBI2 card is required for this Library configuration to operate.</b>		
		Replace the LBI1 card with an LBI2 card.	8-60

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
93	<b>A failure was detected in the drive communication hardware within the Library: the Library cannot communicate with one or more drives (note the physical location of the failing drive, this information is presented with the SAC).</b>		
	AA,AB 17	If the accompanying message indicated that the Library cannot communicate with one specific tape drive ( <b>for AIT Library system, this applies to a group of 2 drives</b> ):	
		<ul style="list-style-type: none"> <li>• Check to make sure that the tape drive in question is powered on and has a drive communication cable attached to it.</li> <li>• Replace the failing tape drive.</li> <li>• Replace the LBI2 cable in the failing frame.</li> <li>• Replace the LBI2 card in the failing frame.</li> </ul>	<p>8-19</p> <p>11-17</p> <p>8-60</p>
	17	If the Library cannot communicate with multiple drives:	
	AA,AB	<ul style="list-style-type: none"> <li>• Replace the LBI2 card in the failing frame.</li> <li>• Replace the LBI2 cable in the failing frame.</li> </ul>	<p>8-60</p> <p>11-17</p>
	11 10	<ul style="list-style-type: none"> <li>• Replace the LMC3 card</li> <li>• Replace the LSC2 card.</li> </ul>	<p>8-57</p> <p>8-56</p>
94	<b>Communication was established between the Library and the tape drive but the Library cannot determine the status of a particular Tape drive.</b>		
		Replace the failing tape drive.	8-19
	AA,AB	Replace LBI2 cable in the failing frame.	11-17
	17	Replace LBI2 card in the failing frame.	8-60

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>D0</b>	<b>The Library detected that one of the DC Power Supplies has failed, this error condition only occurs in Libraries equipped with the Dual DC Power Supplies Feature.</b>		
	Use the Operator Panel to retrieve additional information to determine the failing Power Supply (Main Menu >Service >Diags >PowerSup). The screen will show: 1. 24V DC:Y/N AC:Y/N 1. 48V DC:Y/N AC:Y/N 2. 24V DC:Y/N AC:Y/N 2. 48V DC:Y/N AC:Y/N The first two lines are used to indicate status of the first group of Power Supplies and the last two lines are reserved for the redundant Power Supplies. The DC output and AC input status of each Power Supply is displayed: Y indicates good status and N indicates failing status. Note the failing Power Supply.		
	50,51	If the failing Power Supply only shows missing DC output, replace the failing DC Power Supply.	8-67
	50,51 54	If the failing Power Supply shows both missing DC output and AC input, do the following: <ul style="list-style-type: none"> <li>• Make sure the AC Power cord to the supply is plugged in and the Power Supply switch on the AC Power Compartment is ON.</li> <li>• Replace the failing Power Supply.</li> <li>• Replace the AC Power Compartment.</li> </ul>	8-67 8-66

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
D1	<b>The Library detected that AC input to one bank of the DC Power Supplies is missing, this error condition only occurs in Libraries equipped with the Dual DC Power Supplies Feature.</b>		
	Use the Operator Panel to retrieve additional information to determine the failing bank of Power Supplies (Main Menu >Service >Diags >PowerSup). The screen will show: <ol style="list-style-type: none"> <li>1. 24V DC:Y/N AC:Y/N</li> <li>1. 48V DC:Y/N AC:Y/N</li> <li>2. 24V DC:Y/N AC:Y/N</li> <li>2. 48V DC:Y/N AC:Y/N</li> </ol> The first two lines are used to indicate status of the first group of Power Supplies and the last two lines are reserved for the redundant Power Supplies. The DC output and AC input status of each Power Supply is displayed: Y indicates good status and N indicates failing status. Note the failing group of Power Supply.		
	54	<ul style="list-style-type: none"> <li>Make sure the AC Power cord to the failing bank of Power supplies is plugged in and the Power Supply switch on the AC Power Compartment is ON.</li> <li>Replace the AC Power Compartment.</li> </ul>	8-66
E0	<b>A cartridge is stuck in the Gripper Assembly, Operator Intervention is required to remove the cartridge from the Gripper Assembly</b>		
		Perform Procedure <i>Cartridge Removal from Cartridge Accessor</i> on page 8-14.	8-14
E1	<b>The Insert/Eject Station door is not fully closed, Operator Intervention is required to close the door.</b>		
		Close the Insert/Eject Station door	Figure 7-1
E2	<b>The front door(s) are not fully closed, Operator Intervention is required to close the door(s).</b>		
		Close all the front door(s).	Figure 7-1
	11	Replace LMC 3	8-56

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>E3</b>	<b>Wrong SCSI bus connection is detected. A Single Ended SCSI device is connected to Library Port 0 Differential Adapter.</b>		
		Check the Library configuration and make sur that all devices on the Library SCSI port 0 have the same SCSI type.	Figure 7-5
		If the problem is not corrected, perform the actions in Service Action Code “30”.	
<b>E4</b>	<b>Wrong SCSI bus connection is detected. A Single Ended SCSI device is connected to Library Port 1 Differential Adapter.</b>		
		Check the Library configuration and make sur that all devices on the Library SCSI port 1 have the same SCSI type.	Figure 7-5
		If the problem is not corrected, perform the actions in Service Action Code “31”.	
<b>E5</b>	<b>The SCSI bus connected to Library Port 0 is not properly terminated.</b>		
		Ensure that both ends of the SCSI bus connected to Library Port 0 are properly terminated. A terminator is shipped with each Library SCSI Adapter card.	
		If the problem is not corrected, perform the actions in Service Action Code “30”.	
<b>E6</b>	<b>The SCSI bus connected to Library Port 1 is not properly terminated.</b>		
		Ensure that both ends of the SCSI bus connected to Library Port 1 are properly terminated. A terminator is shipped with each Library SCSI Adapter card.	
		If the problem is not corrected, perform the actions in Service Action Code “31”.	

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>E7</b>	<b>The Gripper Assembly detected that a cartridge is not present in the Grip fingers. The cartridge may have been dropped or the Get operation is not successful.</b>		
		Look and see if the cartridge is in its storage cell, in the base of the Gripper Assembly or on the floor of the Library. Recover the cartridge and re-inventory the Library.	
<b>E8</b>	<b>During a accessor move to put cartridge after a successful Get command, the Gripper Assembly detected that the cartridge is no longer present in the Grip fingers.</b>		
		<p>Look into the Gripper Assembly base or on the floor of the Library and see if a cartridge can be located.</p> <p>If a cartridge is found:</p> <ul style="list-style-type: none"> <li>Recover the cartridge and re-inventory the Library.</li> </ul> <p>If <b>no</b> cartridge is found:</p> <ul style="list-style-type: none"> <li>Perform the actions in Service Action Code "73".</li> </ul>	
<b>F0</b>	<b>Failures were detected while running the diagnostic loop test from the LSC card to the LMC card.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
	11	Replace Library Machine Control (LMC) card.	8-57
<b>F1</b>	<b>Failures were detected while running the diagnostic loop test from the LSC card to the LPN1 card.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
	11	Replace Library Machine Control (LMC) card.	8-57
	12	Replace Operator Panel (LPN1) card.	8-58
	A1	Replace the Operator Panel cable.	10-3
	A1	Replace the I/E Station cable.	10-3

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>F2</b>	<b>Failures were detected while running the diagnostic loop test from the LSC card to the LGR1 card.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
	11	Replace Library Machine Control (LMC) card.	8-57
	15	Replace Y-axis card (LYP1).	8-60
	13	Replace Grip card (LGR1).	8-32
	B6,B7	Replace the X-Axis fixed cables.	10-3
	A2	Replace the X-Axis moving cable.	8-41
	A3	Replace the Y-Axis moving cable.	10-3
<b>F3</b>	<b>Failures were detected while running the diagnostic loop test from the LSC card to all the sensors on the Gripper assembly.</b>		
	A2	Replace the X-Axis moving cable.	8-41
	11	Replace Library Machine Control (LMC) card.	8-57
	13	Replace Grip card (LGR1).	8-32
	10	Replace Library SCSI and Control (LSC) card.	8-56
	15	Replace Y-axis card (LYP1).	8-60
	B6,B7	Replace the X-Axis fixed cables.	10-3
	A3	Replace the Y-Axis moving cable.	10-3
	70	Replace Gripper assembly.	8-24
<b>F4</b>	<b>Failures were detected while running the diagnostic loop test from the LSC card to all the sensors on the Insert/Eject station.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
	11	Replace Library Machine Control (LMC) card.	8-57
	12	Replace Operator Panel (LPN1) card.	8-58
	A1	Replace the Operator Panel cable.	10-3
	A0	Replace the Insert/Eject station cable.	10-3

**Table 6-1** Service Action Codes

Reported SAC	FRU ID	Perform these actions	Reference Information on Page
<b>F5</b>	<b>Failures were detected while running the diagnostic loop test from the LSC card to the X-axis home sensor.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
	11	Replace Library Machine Control (LMC) card.	8-57
	A5	Replace the X-axis home sensor cable.	10-3
<b>F6</b>	<b>Failures were detected while running the diagnostic loop test from the LSC card to the Y-axis home sensor.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
	11	Replace Library Machine Control (LMC) card.	8-57
	15	Replace Y-axis card (LYP1).	8-60
	B6,B7	Replace the X-Axis fixed cables.	10-3
	A2	Replace the X-Axis moving cable.	8-41
	A5	Replace the Y-axis home sensor cable.	10-3
<b>F7</b>	<b>Failures detected in the LSC card during Power On Self Test.</b>		
	10	Replace Library SCSI and Control (LSC) card.	8-56
<b>F8</b>	<b>Failures detected in the LMC card during Power On Self Test.</b>		
	11	Replace Library Machine Control (LMC) card.	8-57
<b>F9</b>	<b>Failures detected in the LGR1 card during Power On Self Test.</b>		
	13	Replace Grip (LGR1) card.	8-32
<b>FA</b>	<b>Failures detected in the LAM1 card during Power On Self Test.</b>		
	1A	Replace Accessor Motion (LAM1) card.	8-61
<b>FB</b>	<b>Preventive Maintenance is required.</b>		
		Perform Procedure <i>Preventive Maintenance</i> on page 8-71.	8-71

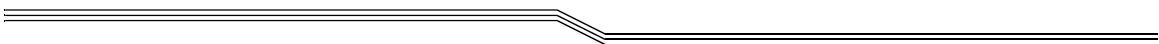
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# 7

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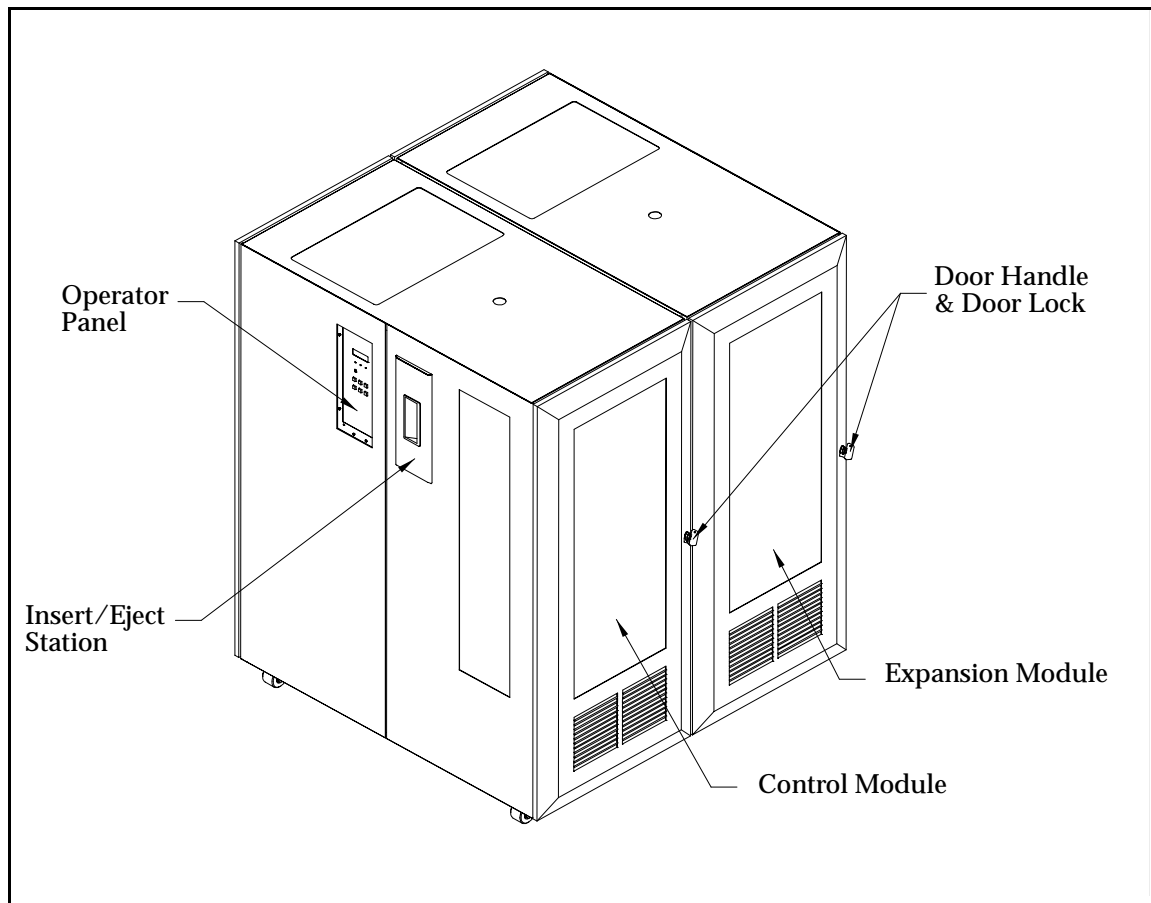
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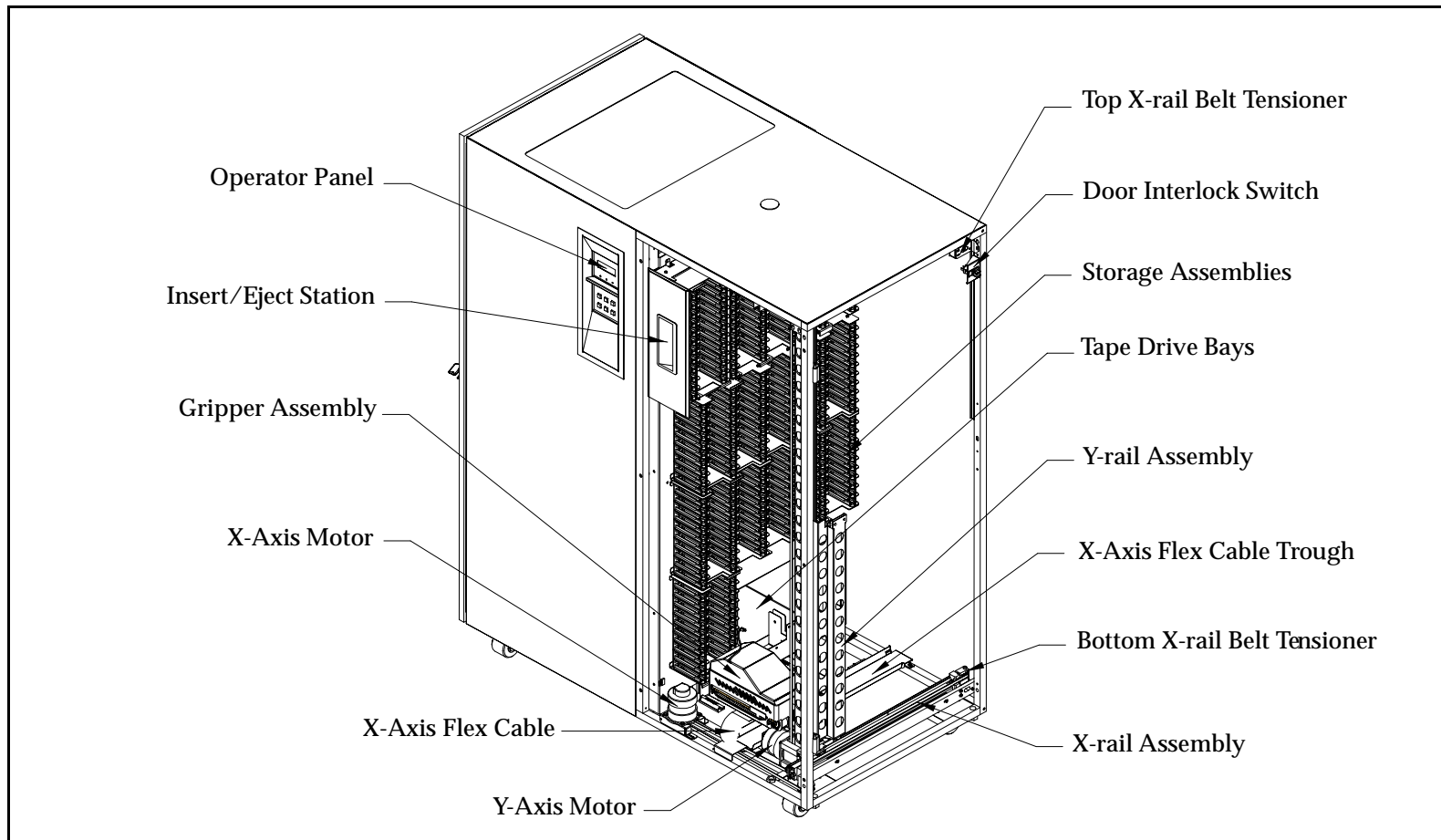
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## Scalar 1000 Subsystem Overview



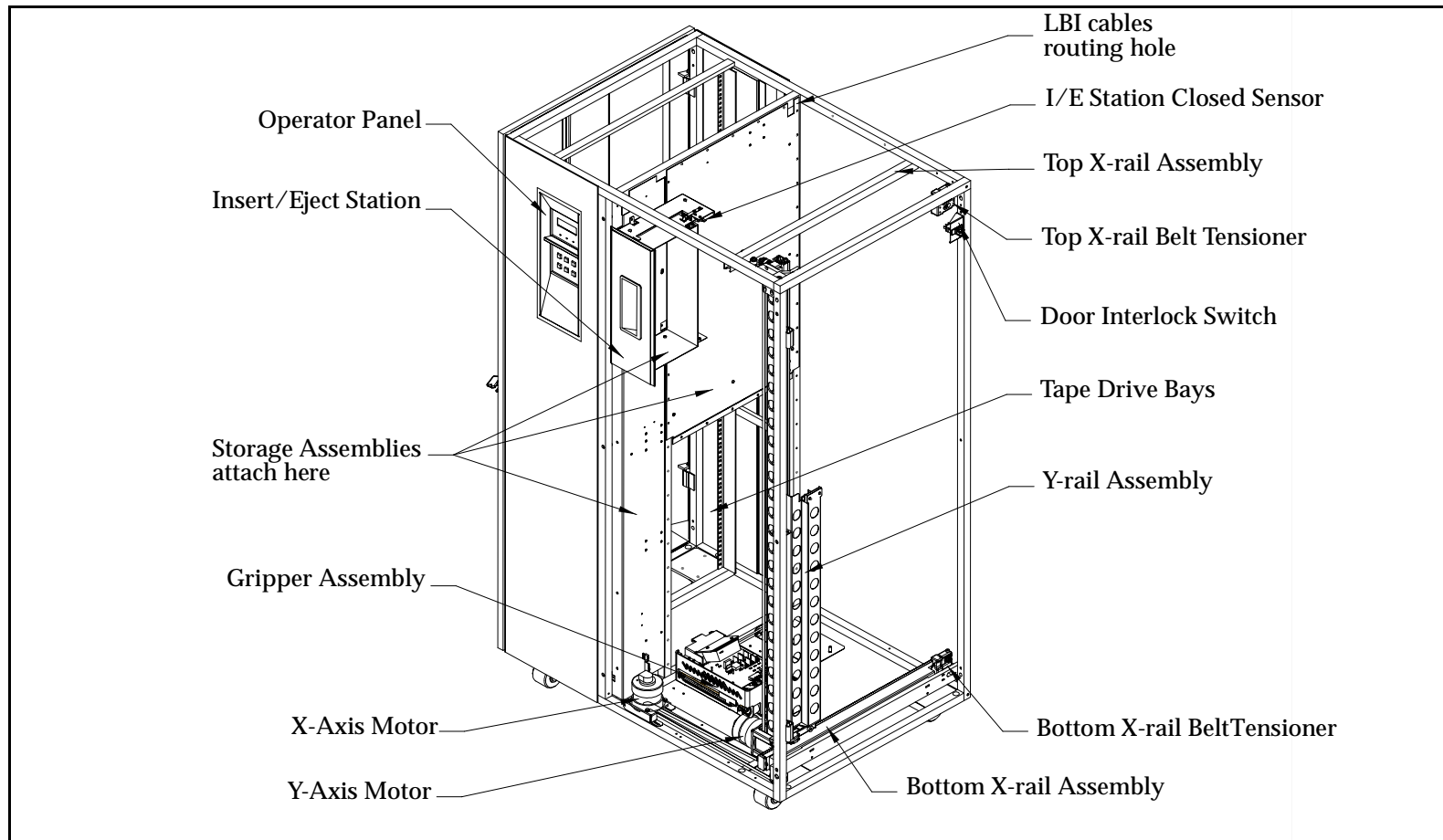
**Figure 7-1** CM & 1 EM Configuration (Model C10 and E10)

## Control Module Front View - Model C10



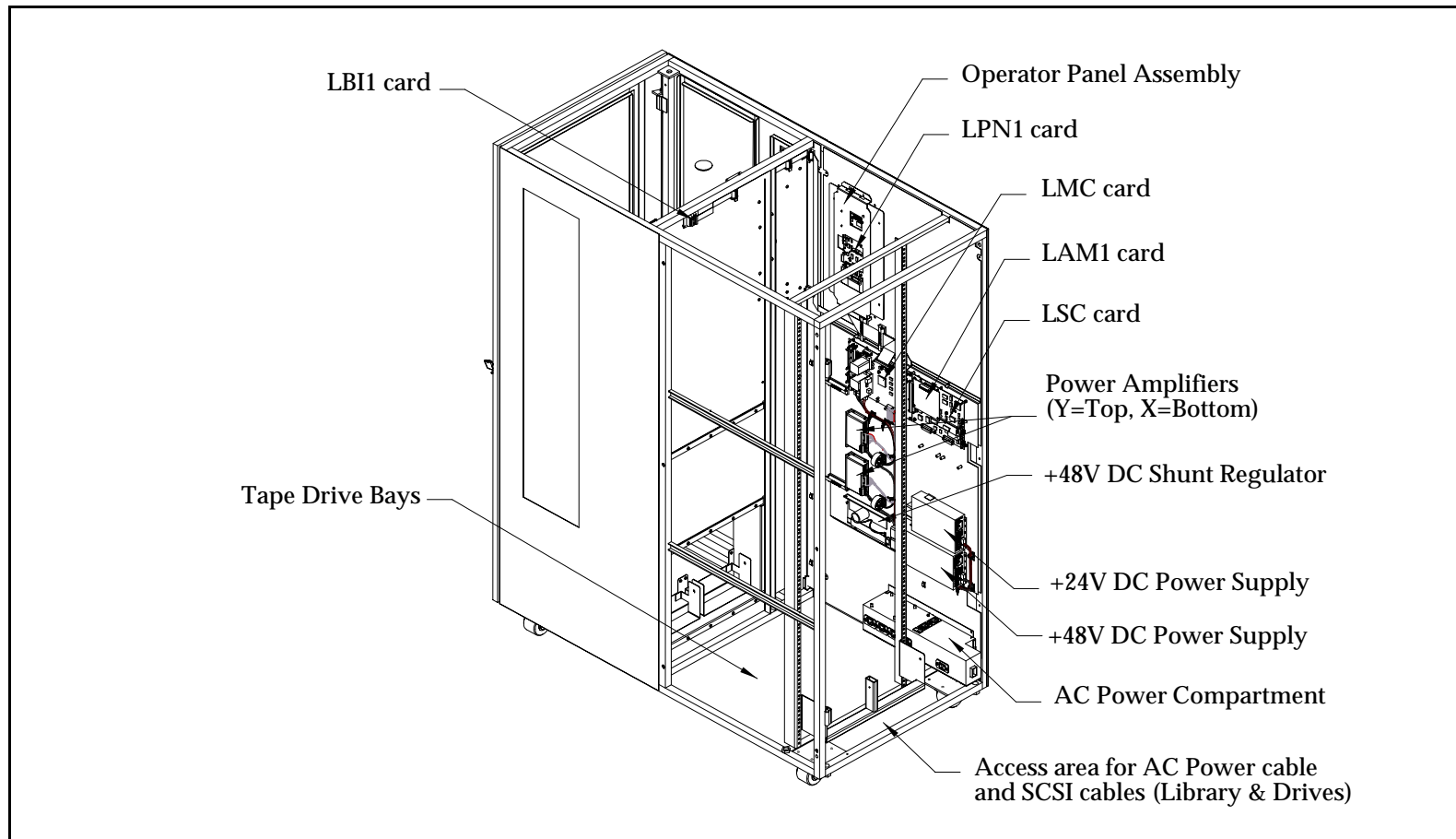
**Figure 7-2** Front View of Control Module Model C10 with Front Door and Front Side covers removed

## Control Module Front View - Model C20 & C30



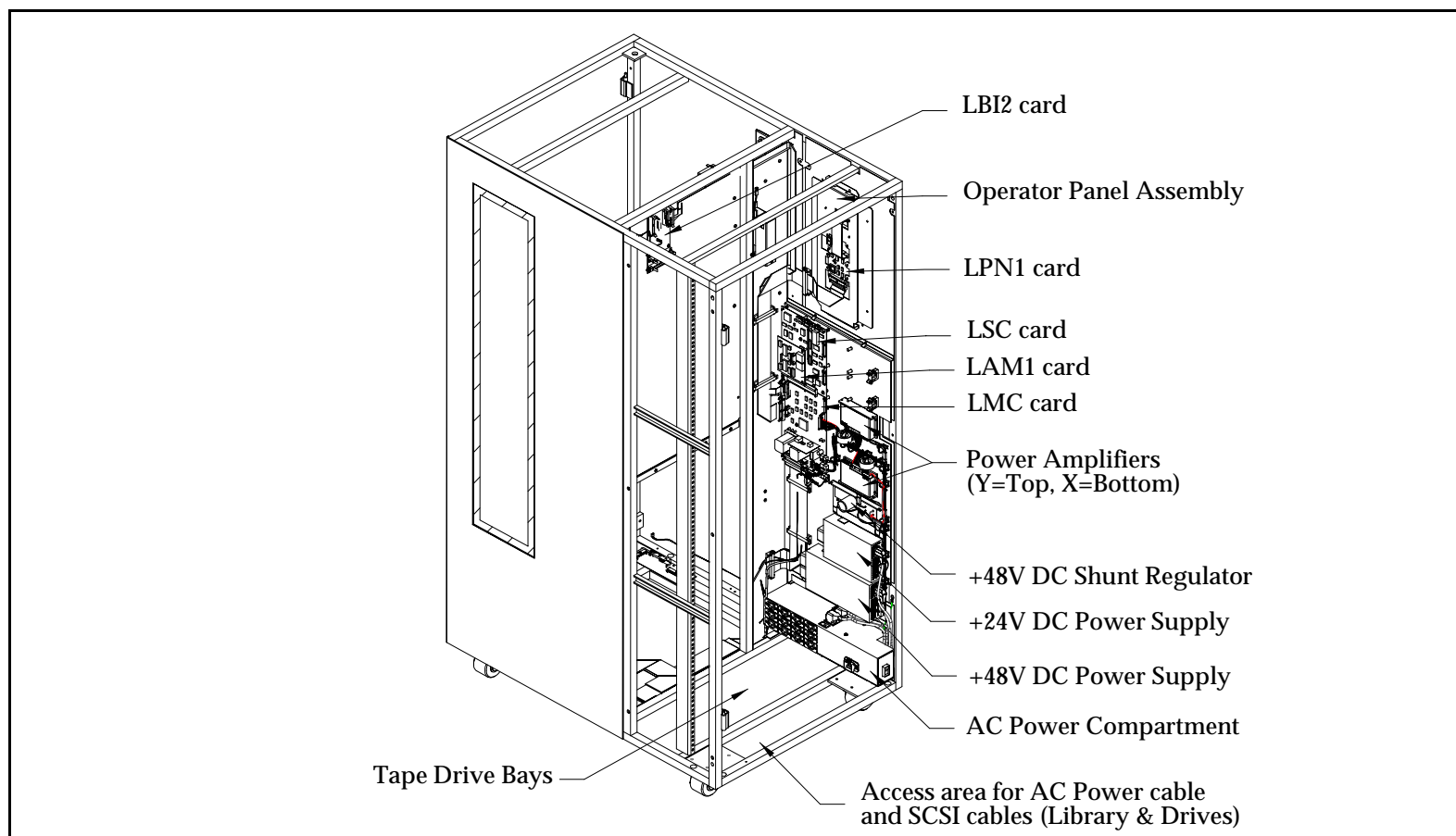
**Figure 7-3** Front View of Control Module Model C20 & C30 (some parts and assemblies are not shown for clarity)

## Control Module Rear View - Model C10



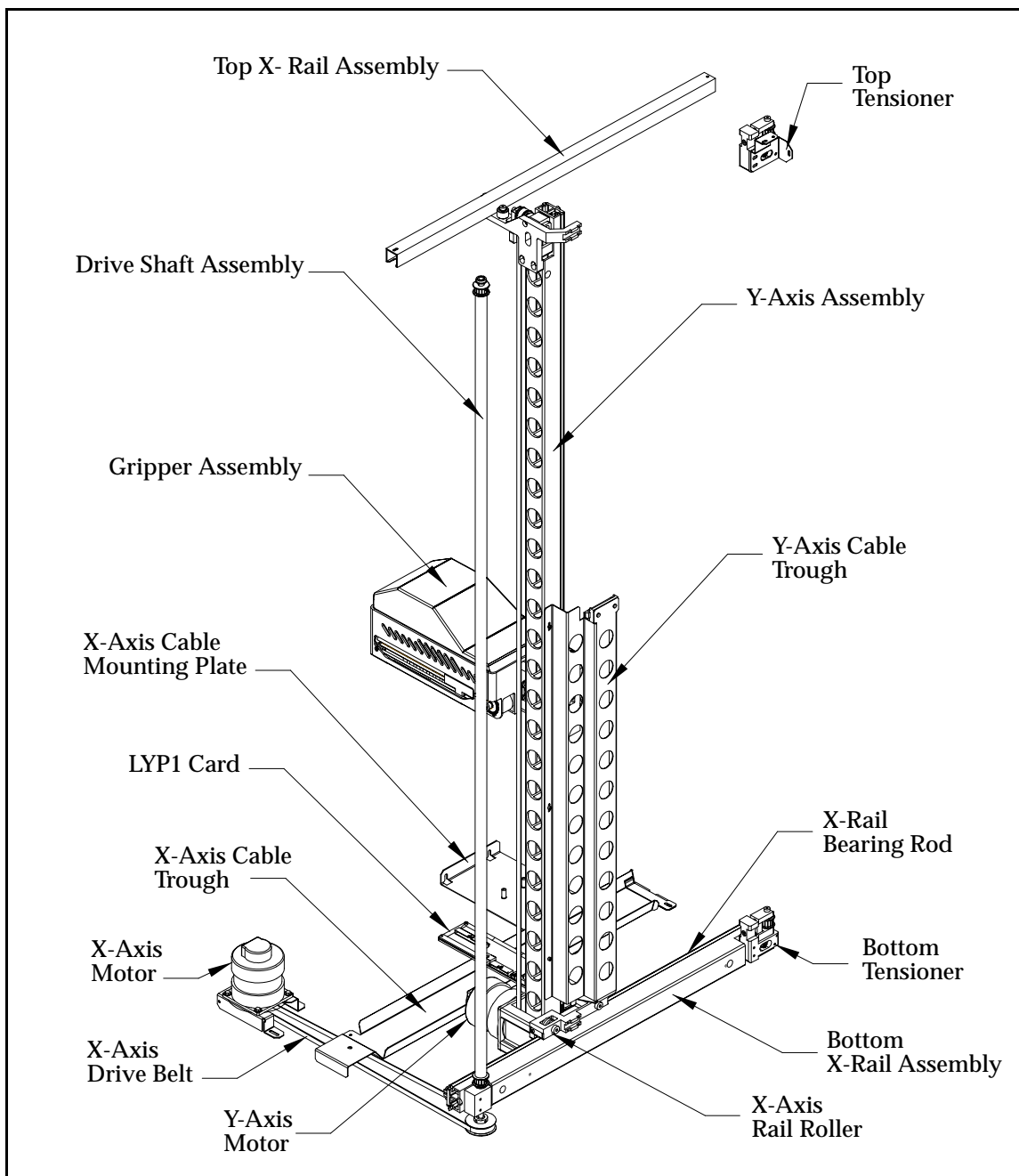
**Figure 7-4** View of Control Module Model C10 with Rear Door, Top and Rear Side Cover removed

## Control Module Rear View - Model C20 & C30



**Figure 7-5** View of Control Module Model C20 & C30 with Rear Door, Top and Rear Side Cover removed

## Cartridge Accessor



**Figure 7-6** Cartridge Accessor

## X-Axis and Y-Axis Assembly

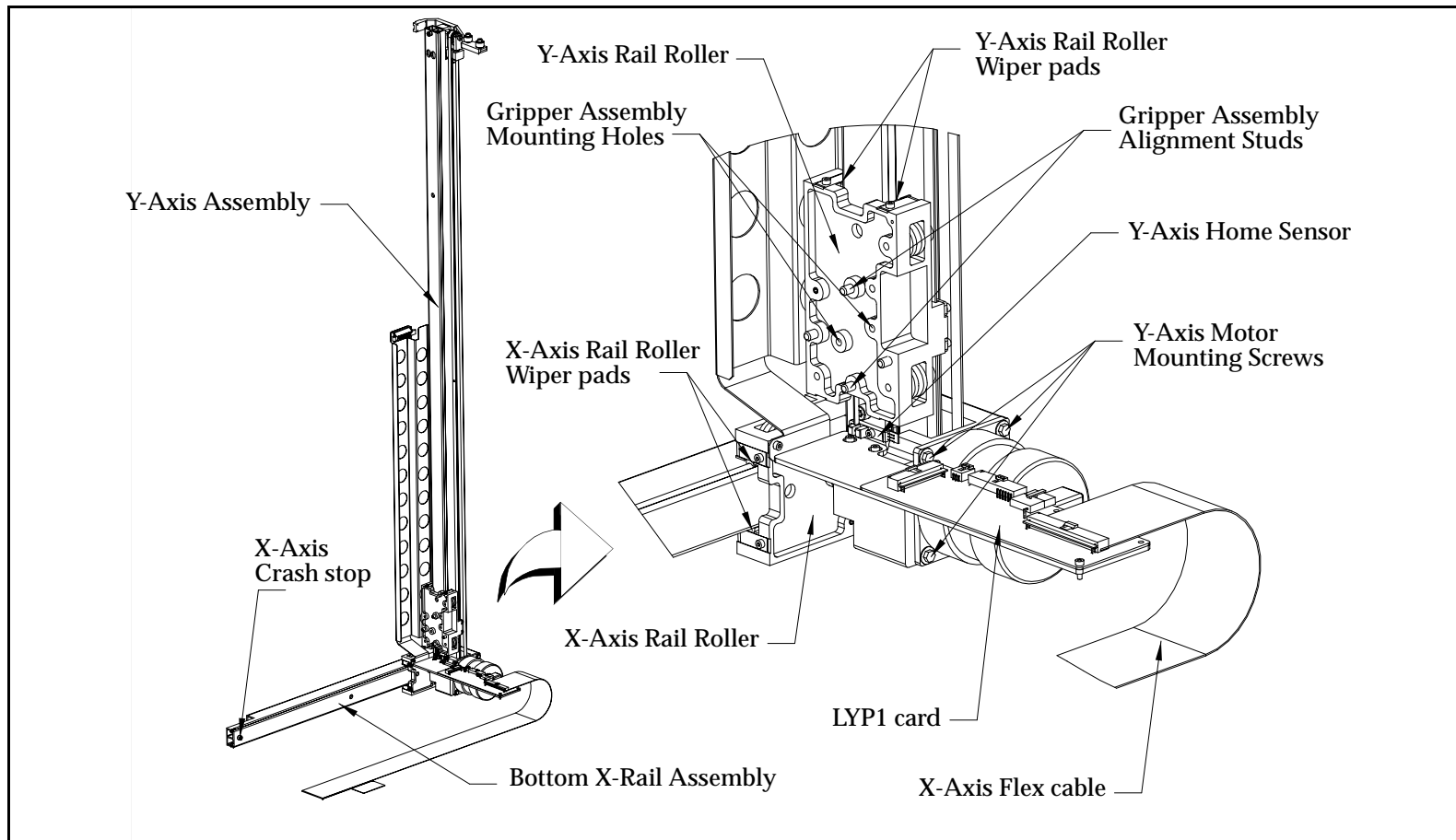
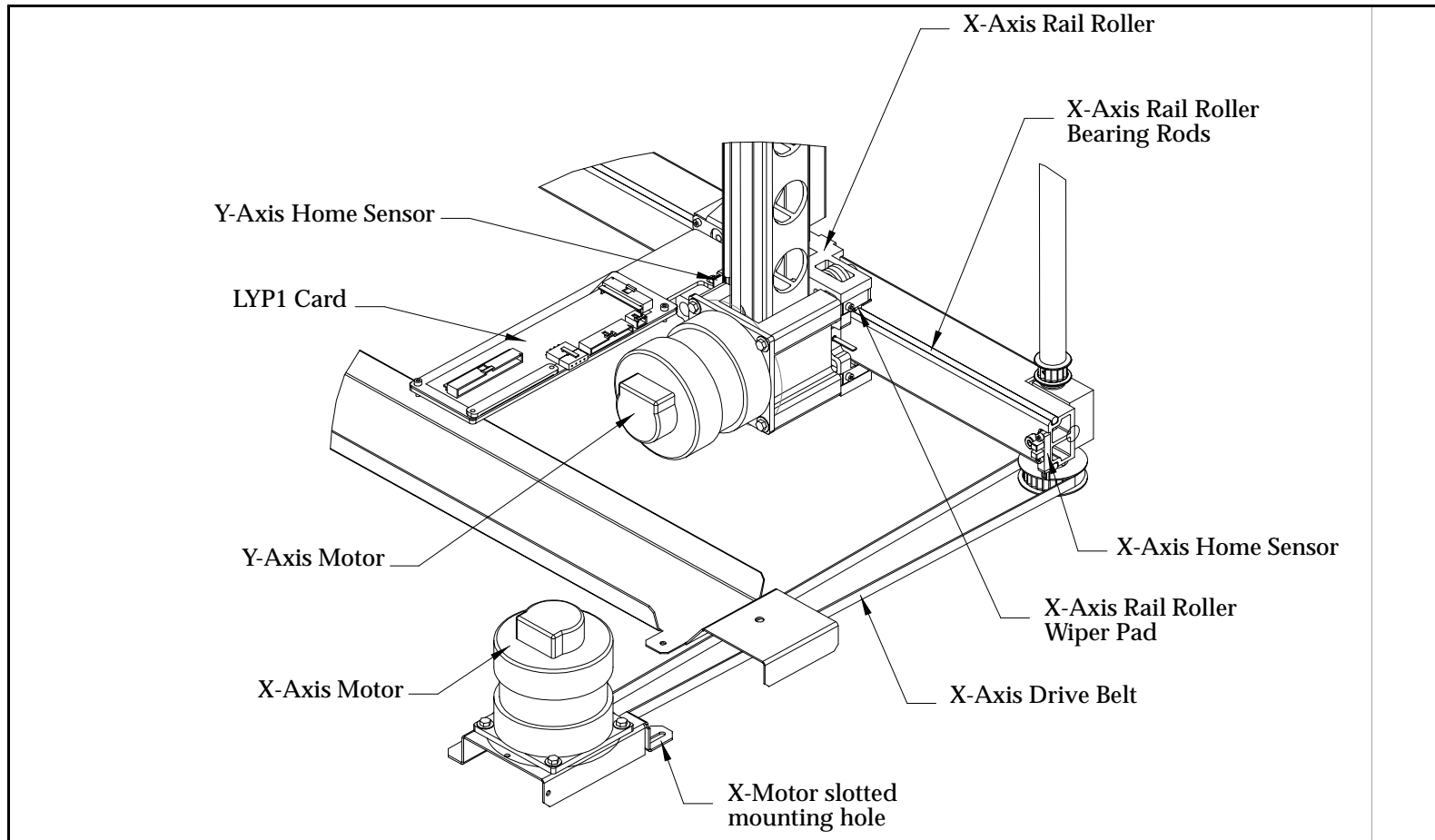


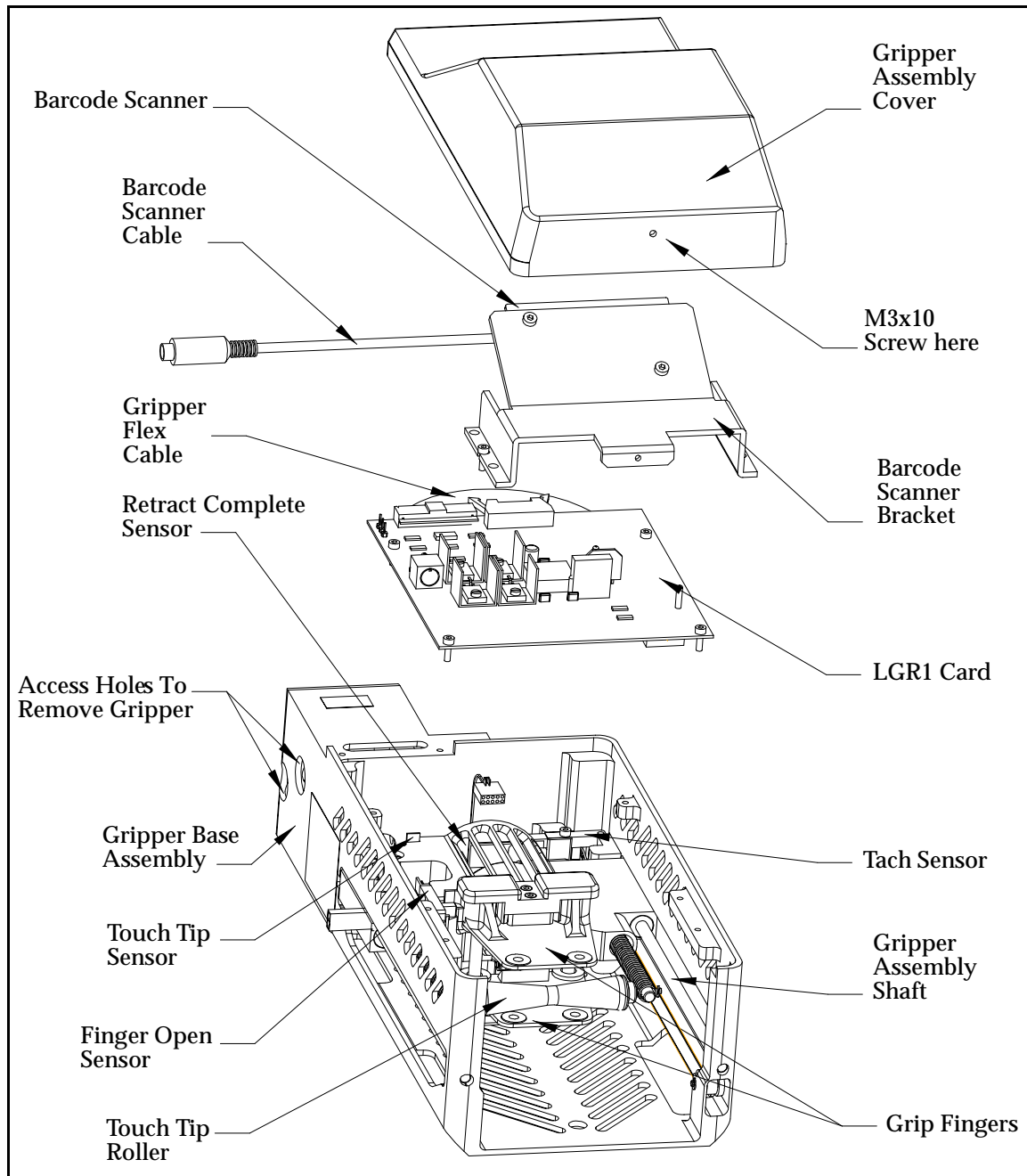
Figure 7-7 X-Axis and Y-Axis Assembly

## X-Axis and Y-Axis FRUs



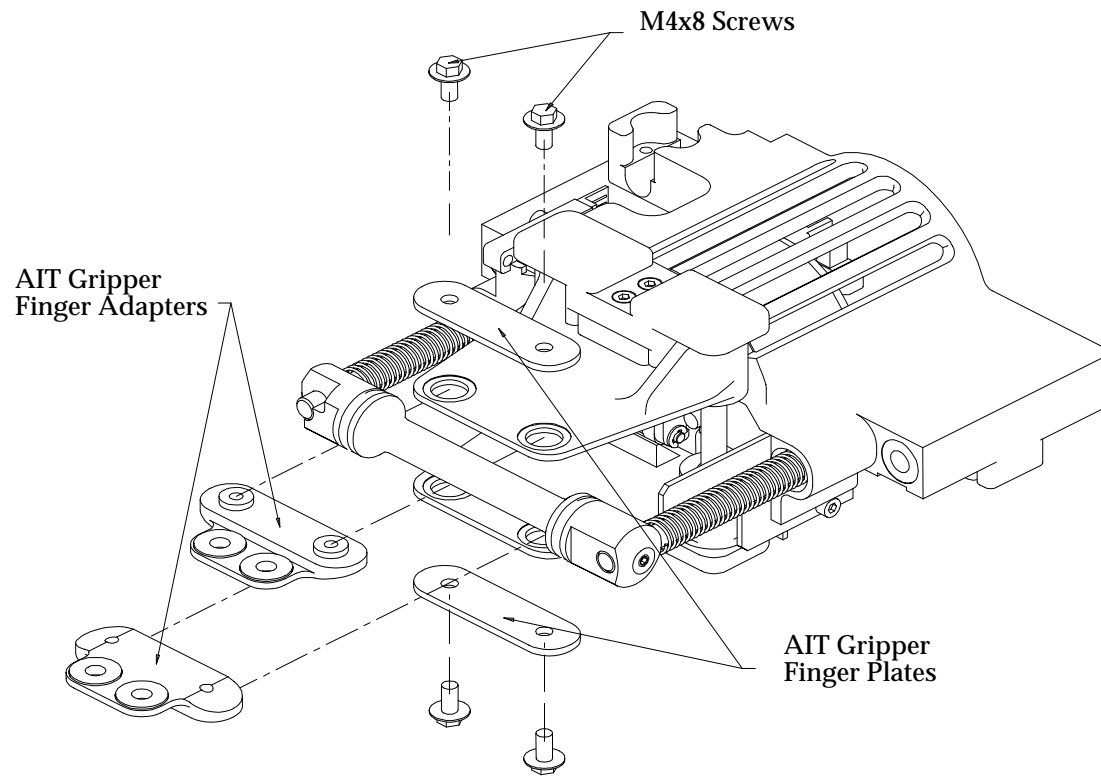
**Figure 7-8** X-Axis and Y-Axis FRUs

## Gripper Assembly



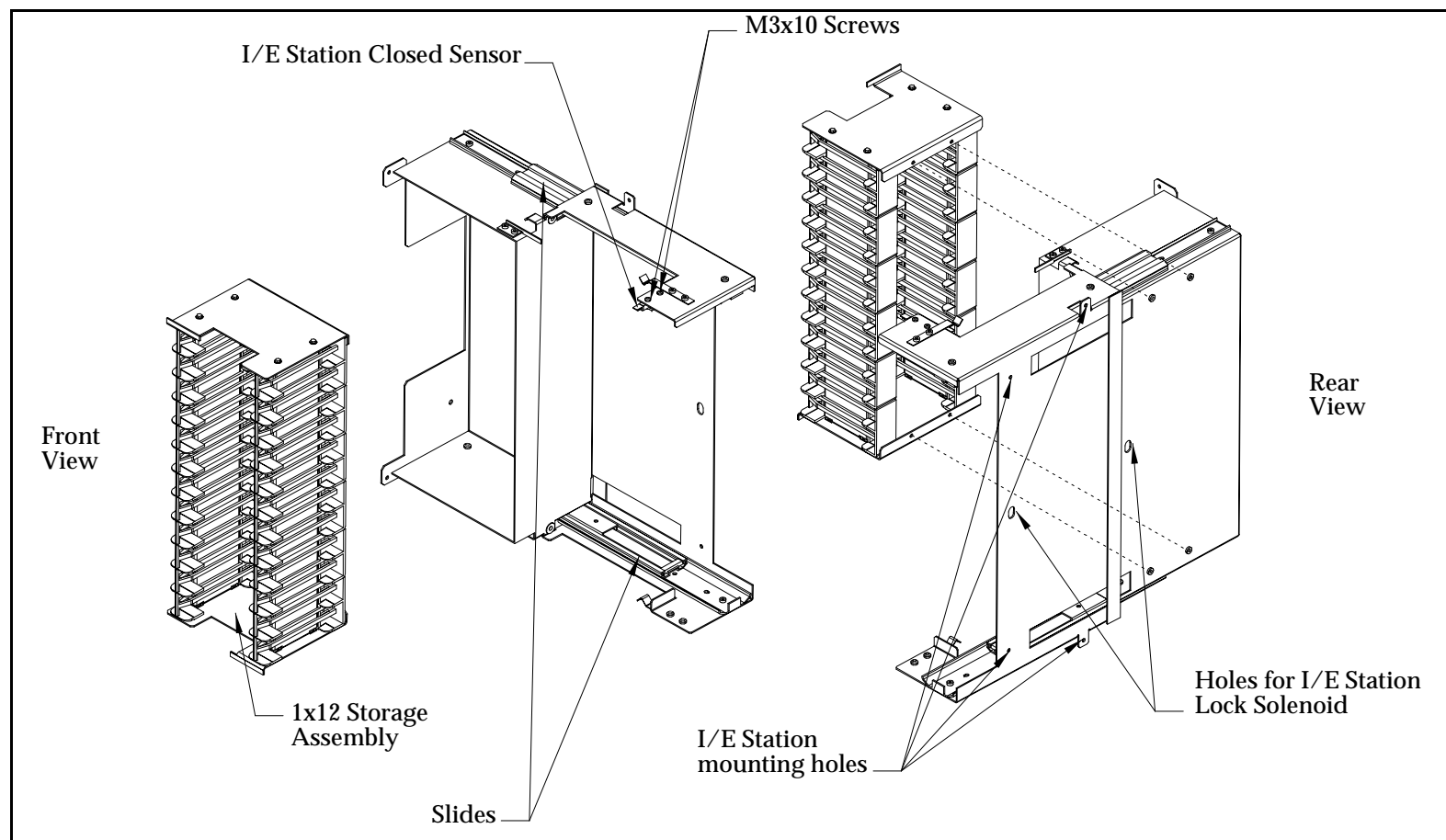
**Figure 7-9** Gripper Assembly

## Gripper Finger Assembly - Model C30



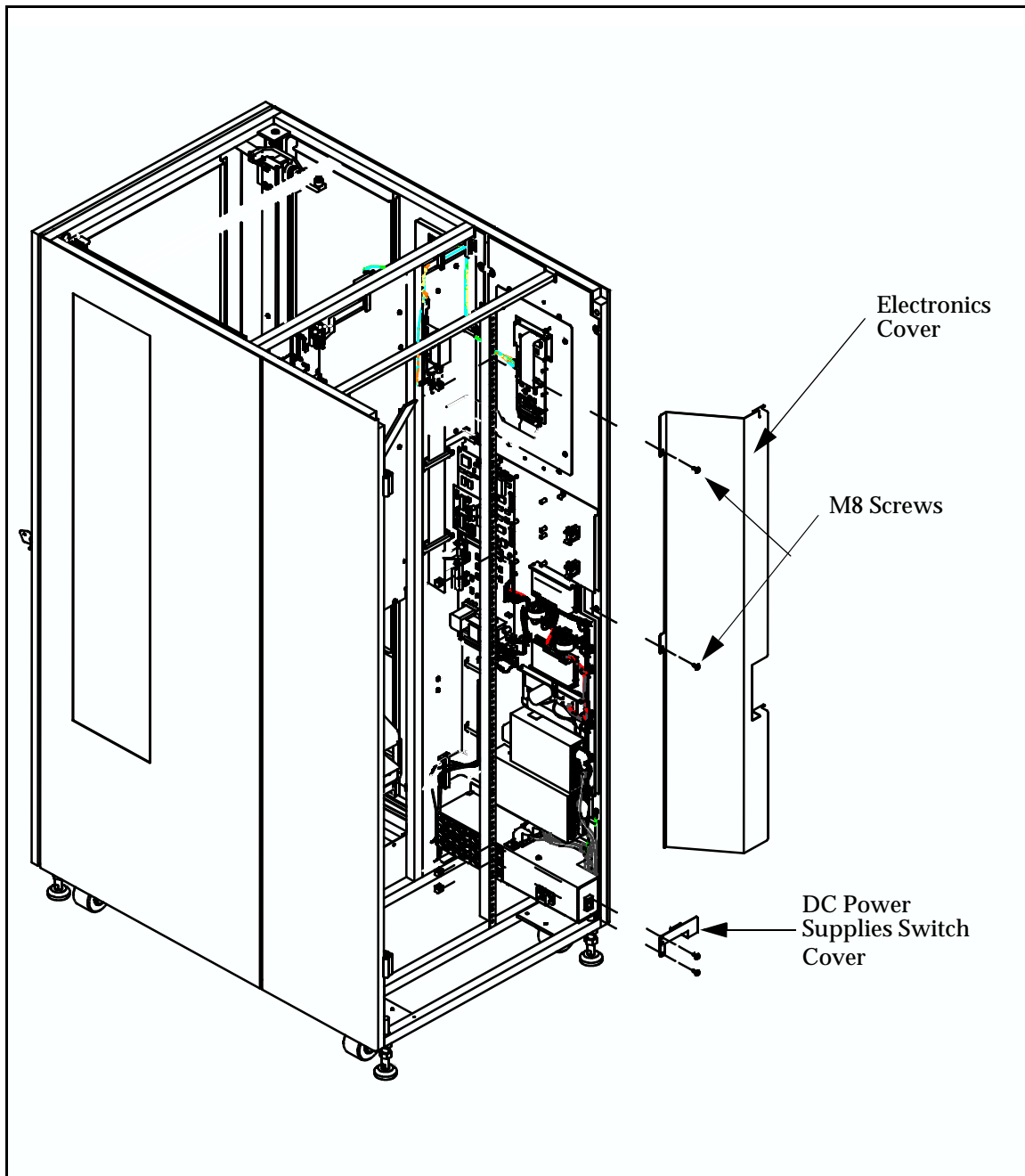
**Figure 7-10** Gripper Finger Assembly - Model C30 (AIT Tape cartridges)

## Insert/Eject Station



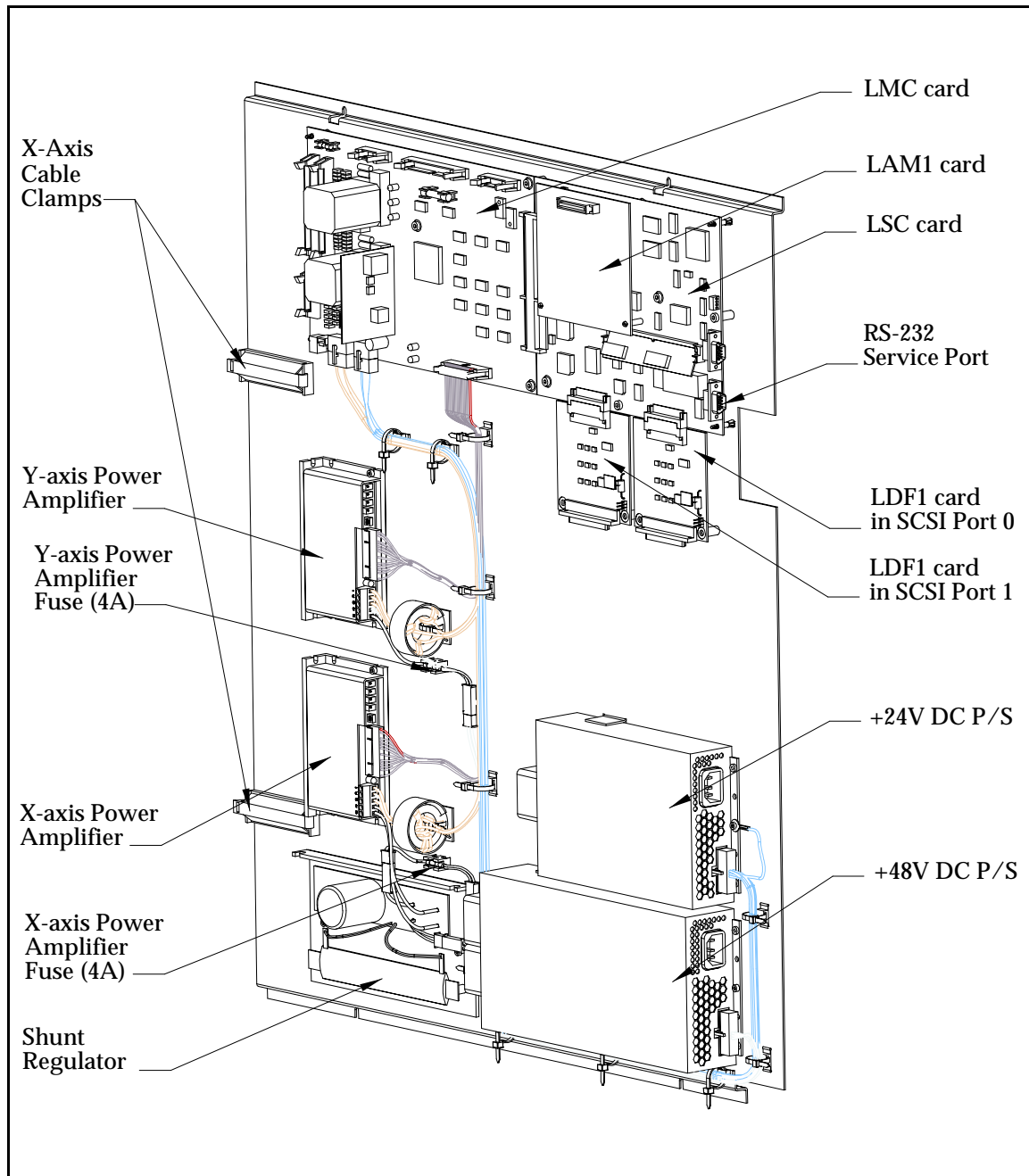
**Figure 7-11** Front and Rear Views of the Insert/Eject Station

## CM Electronics Cover



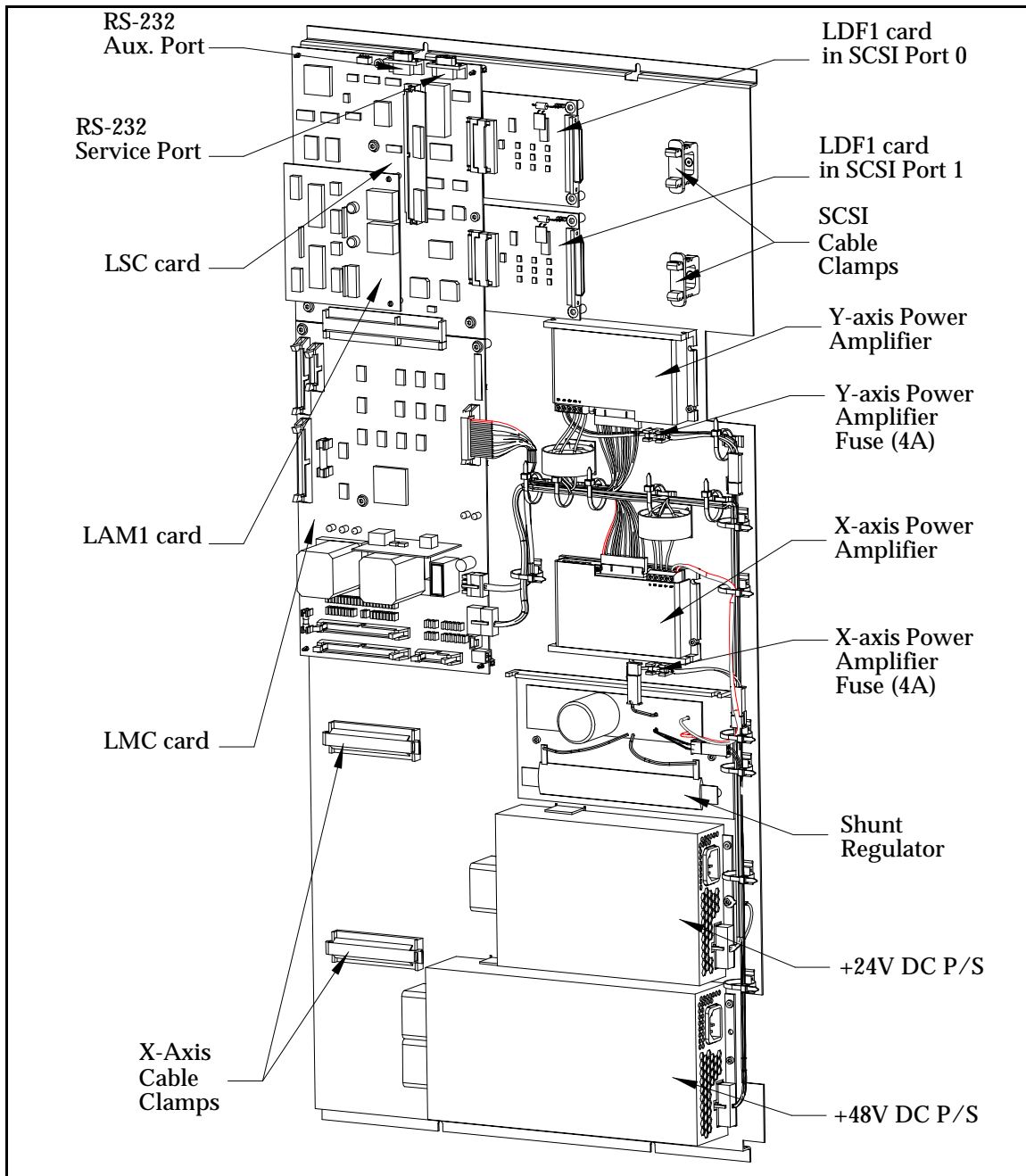
**Figure 7-12** Control Module - Electronics Cover

## CM Model C10 Electrical FRUs



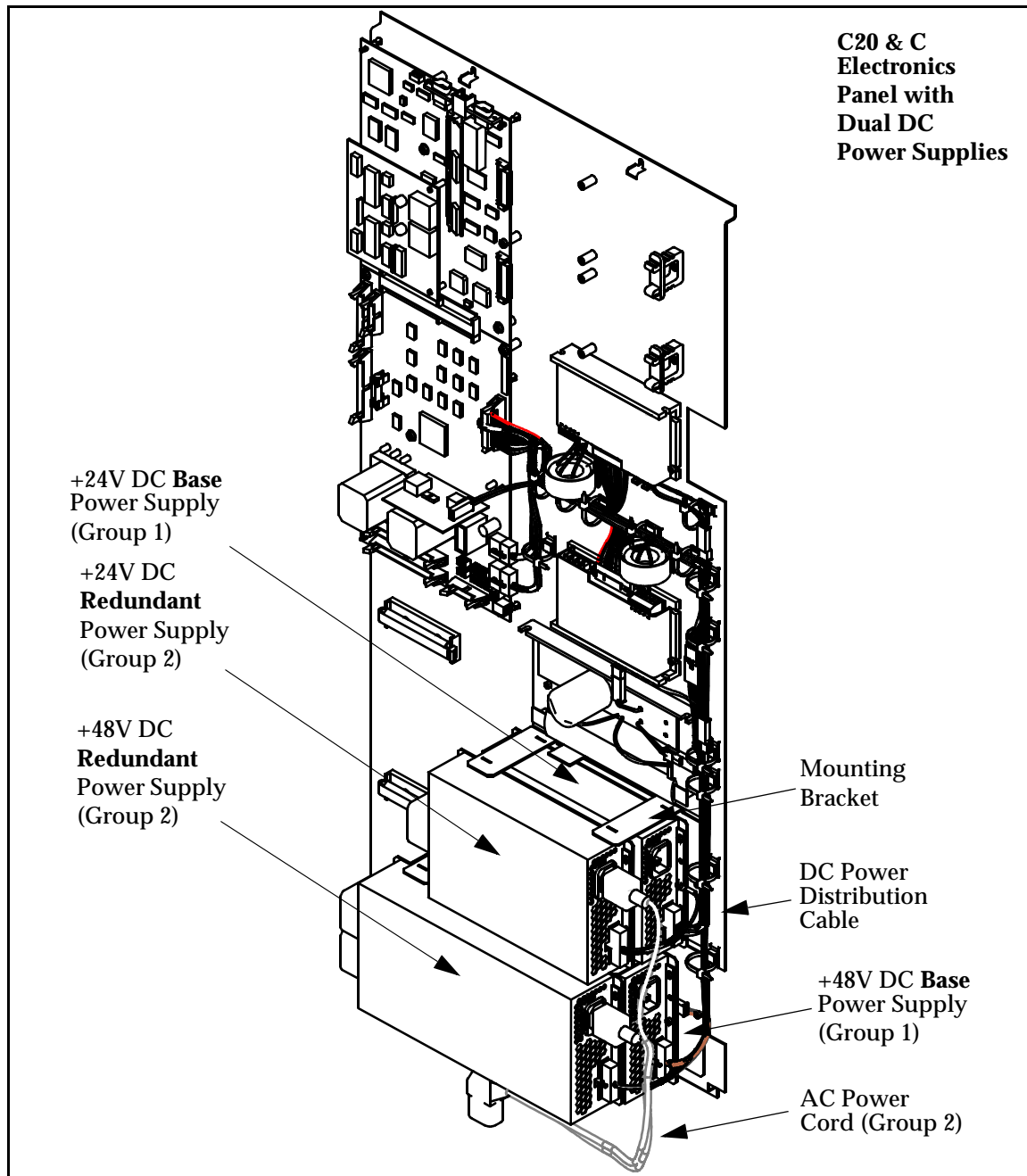
**Figure 7-13** Control Module - Model C10 Electrical FRUs

## CM Model C20 & C30 Electrical FRUs



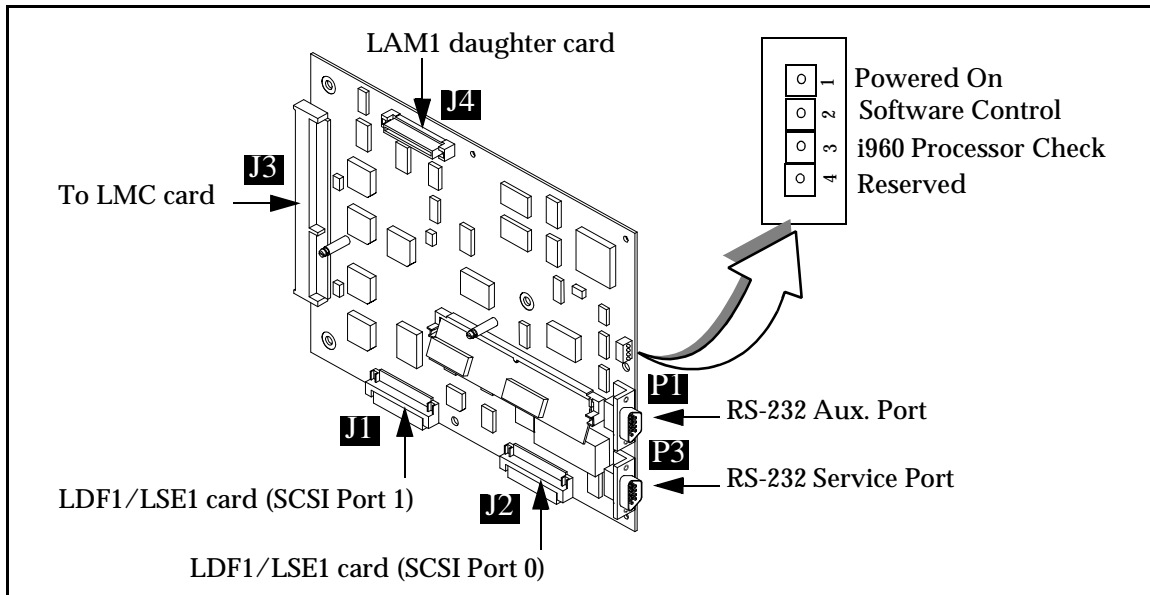
**Figure 7-14** Control Module Model C20 & C30 Electrical FRUs

## CM with Dual DC Power Supplies



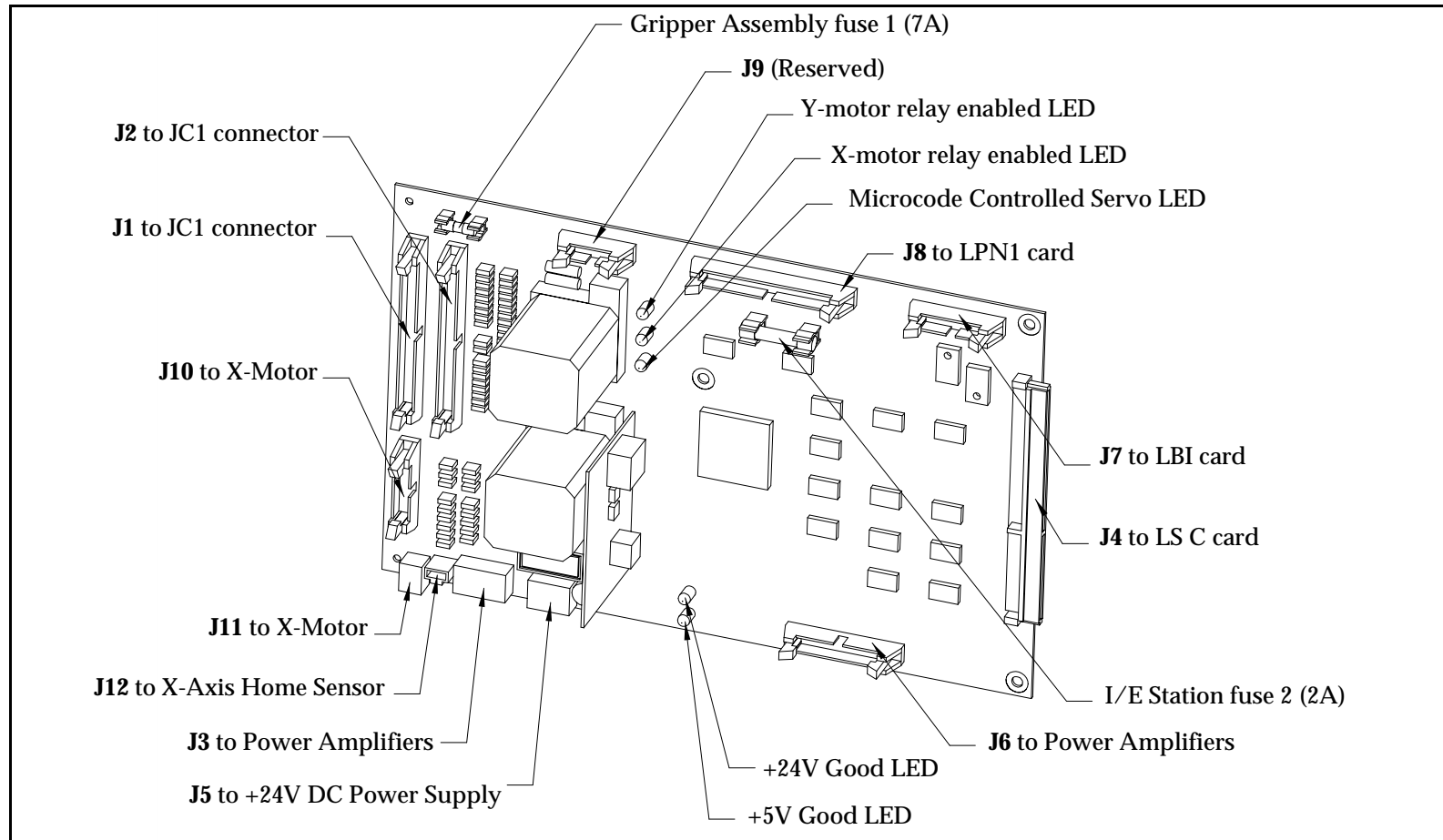
**Figure 7-15** Control Module with Dual DC Power Supplies (C20 or C30 shown)

## LSC (SCSI & Control) Card



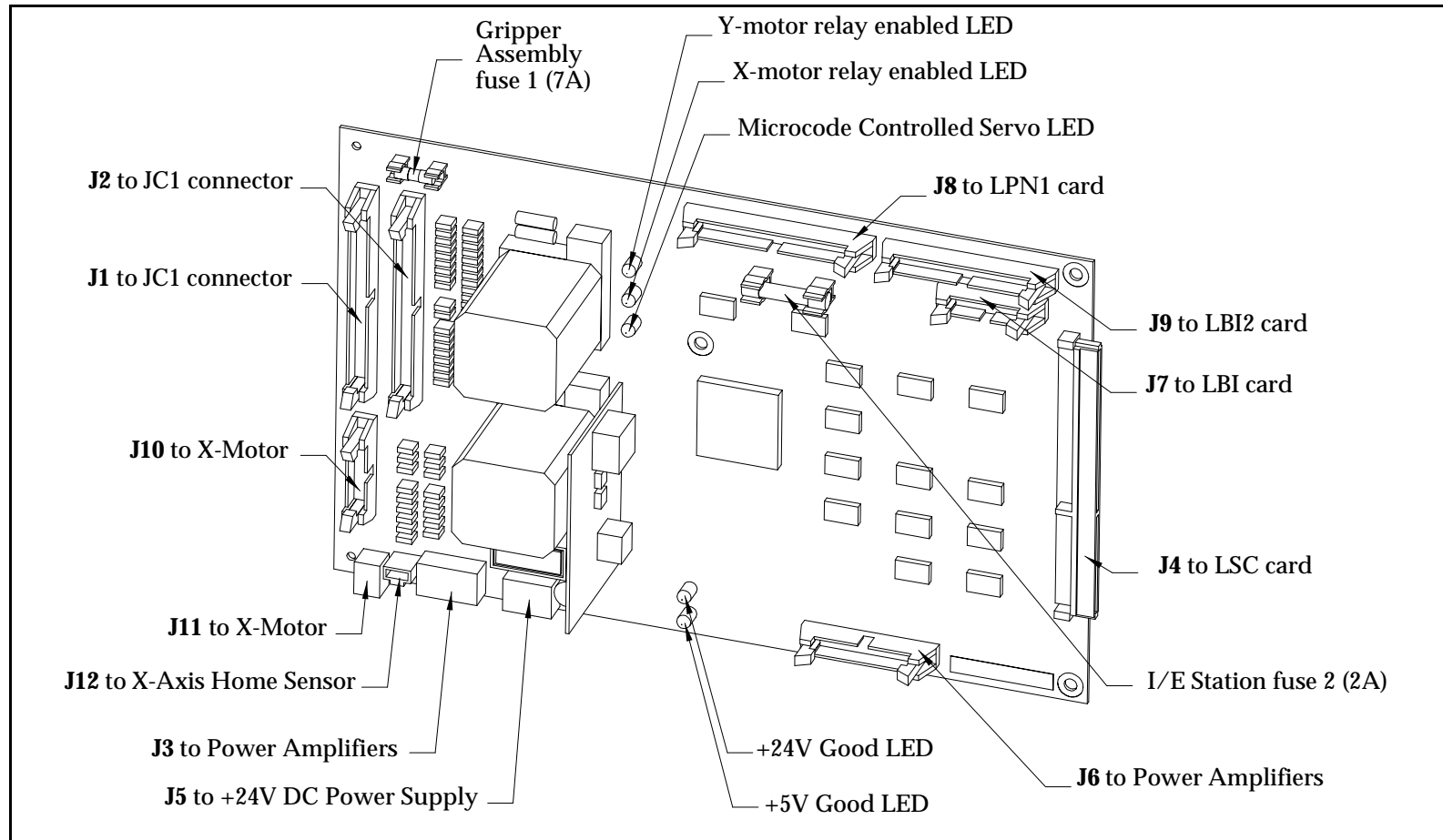
**Figure 7-16** LSC1 or LSC2 card

## LMC1 (Machine Control) Card



**Figure 7-17** LMC1 (Machine Control) card

## LMC3 (Machine Control) Card

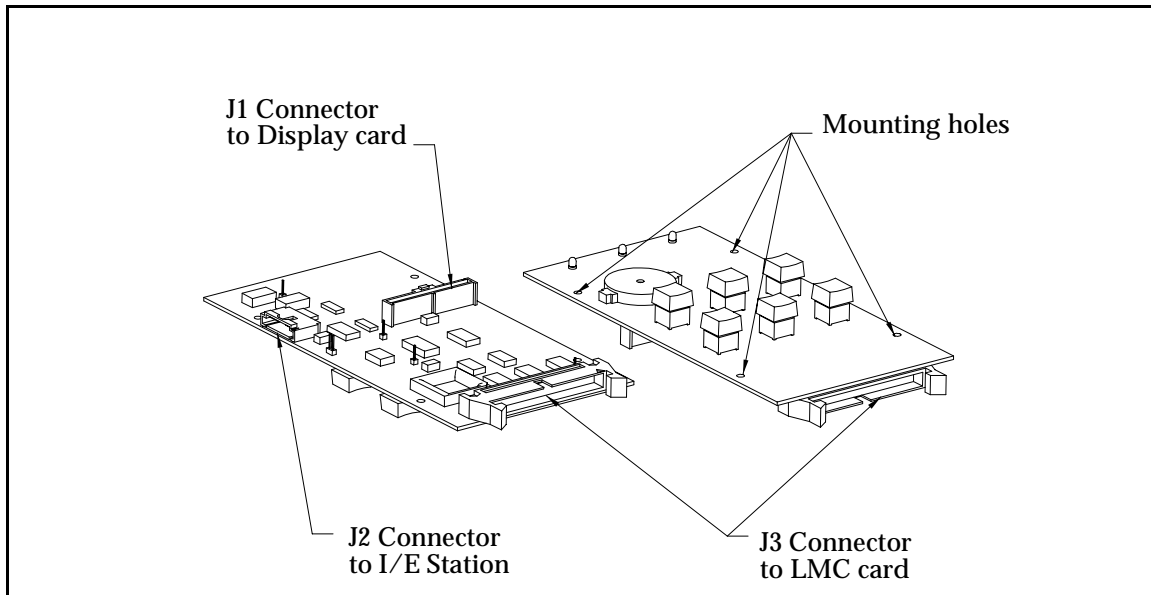


**Figure 7-18** LMC3 (Machine Control) card

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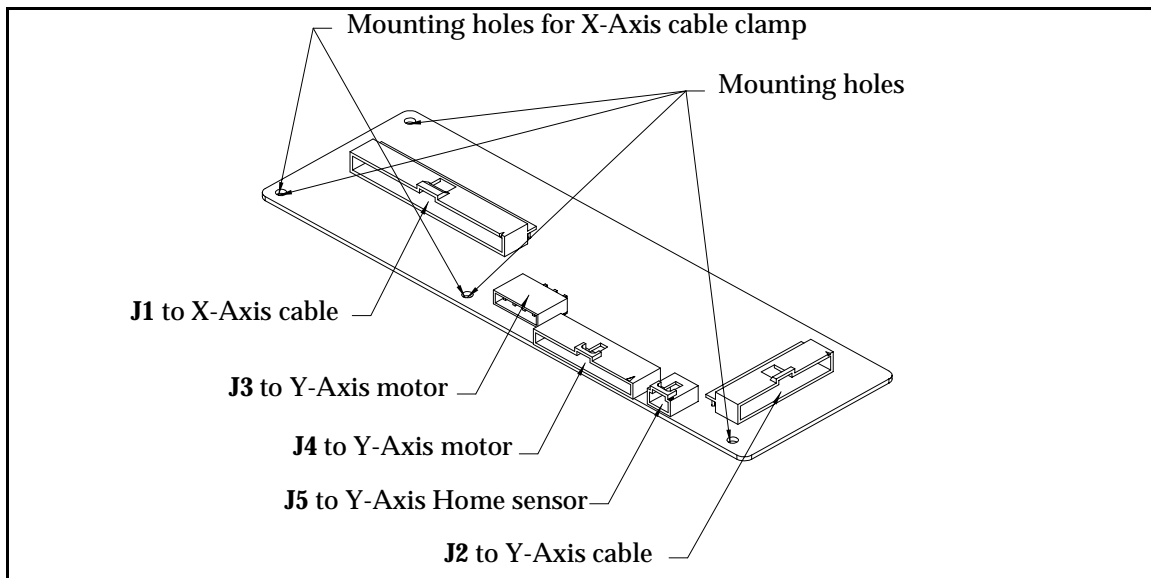
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## LPN1 (Operator Panel) Card



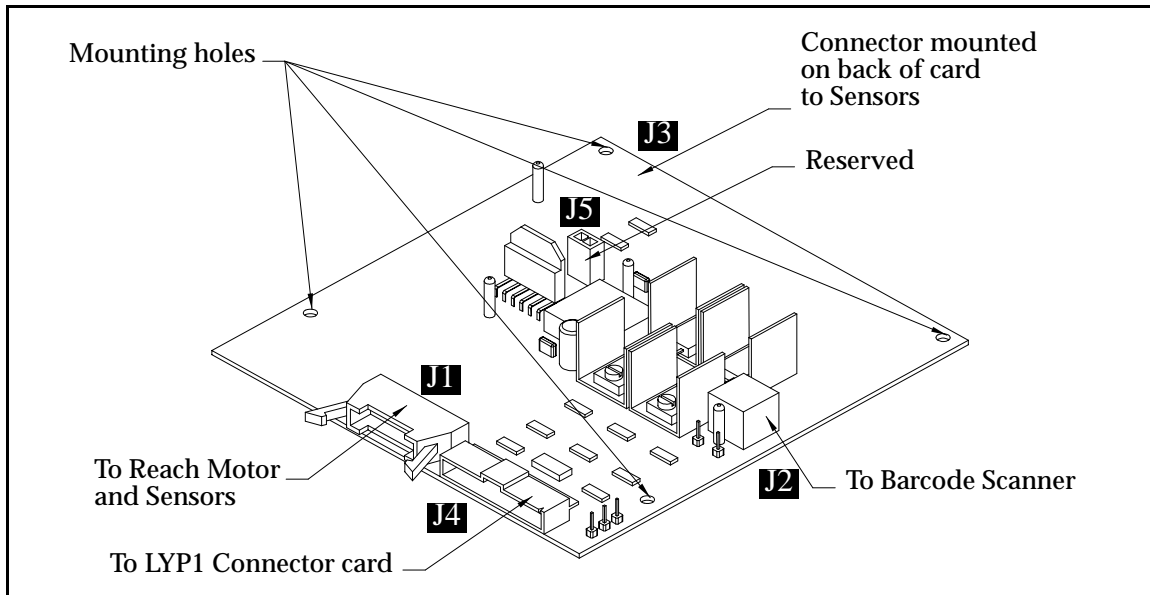
**Figure 7-19** LPN1 (Operator Panel) card

## LYP1 (Y-axis Connector) Card



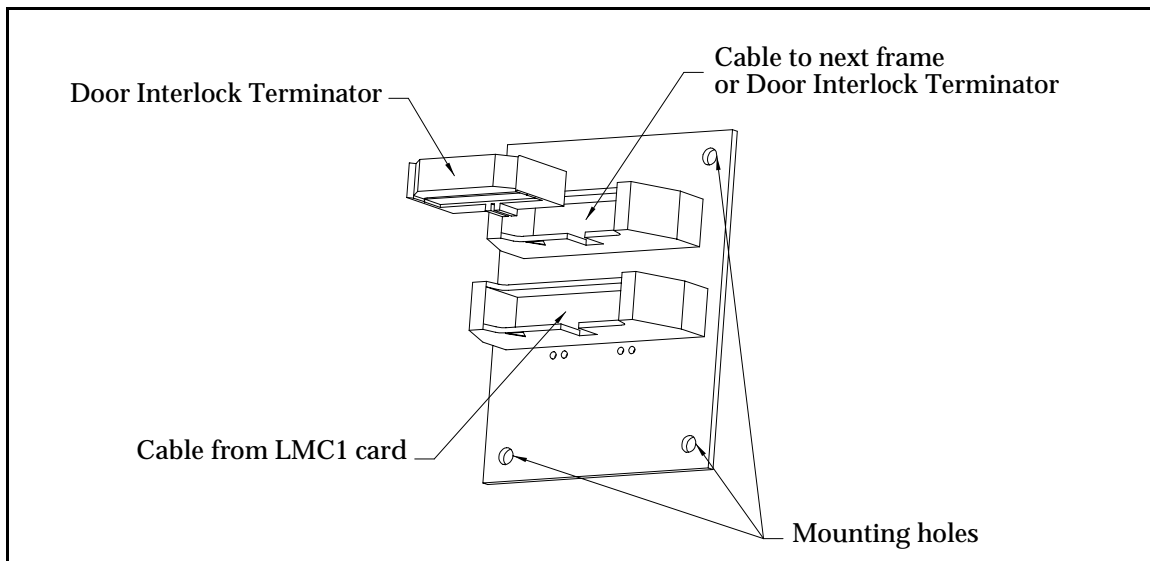
**Figure 7-20** LYP1 card

## LGR1 (Gripper) Card



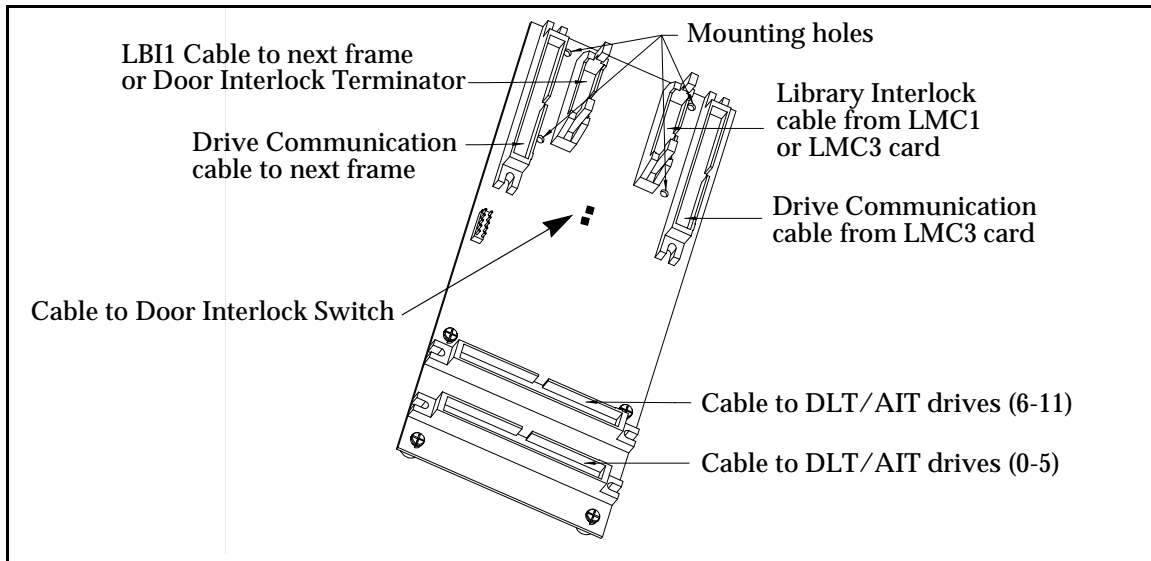
**Figure 7-21** LGR1 card (top view)

## LBI1 Card



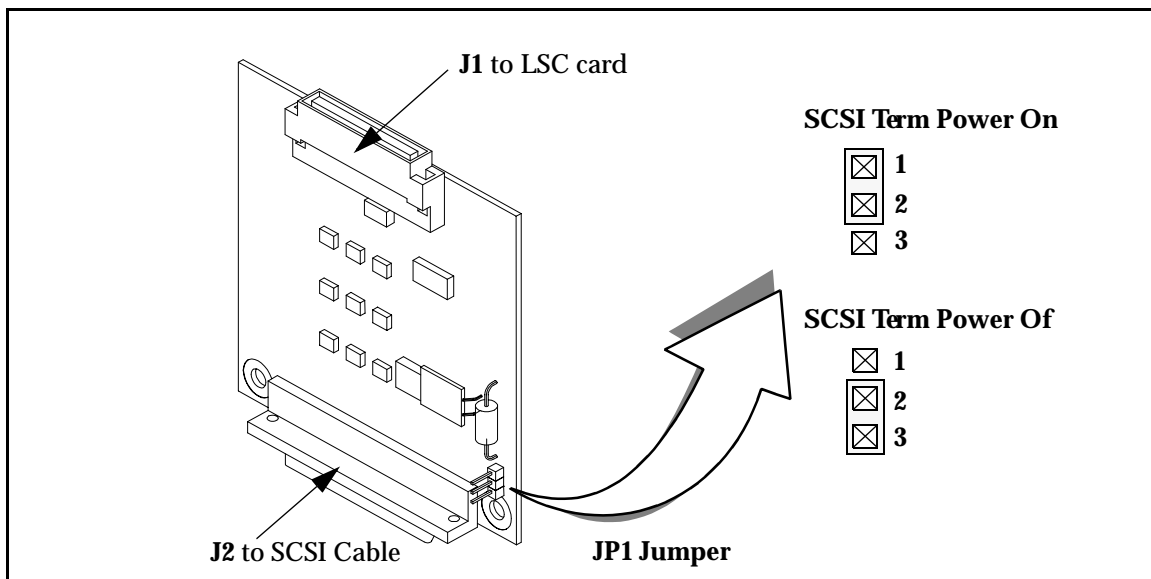
**Figure 7-22** LBI1 (Library Interface) card

## LBI2 Card



**Figure 7-23** LBI2 (Library Interface/Drive Communication) card

## LDF1/LVD1 (SCSI Differential or Low Voltage Differential) Card



**Figure 7-24** LDF1/LVD1 card

## ■ LSE1 (SCSI Single Ended) Card

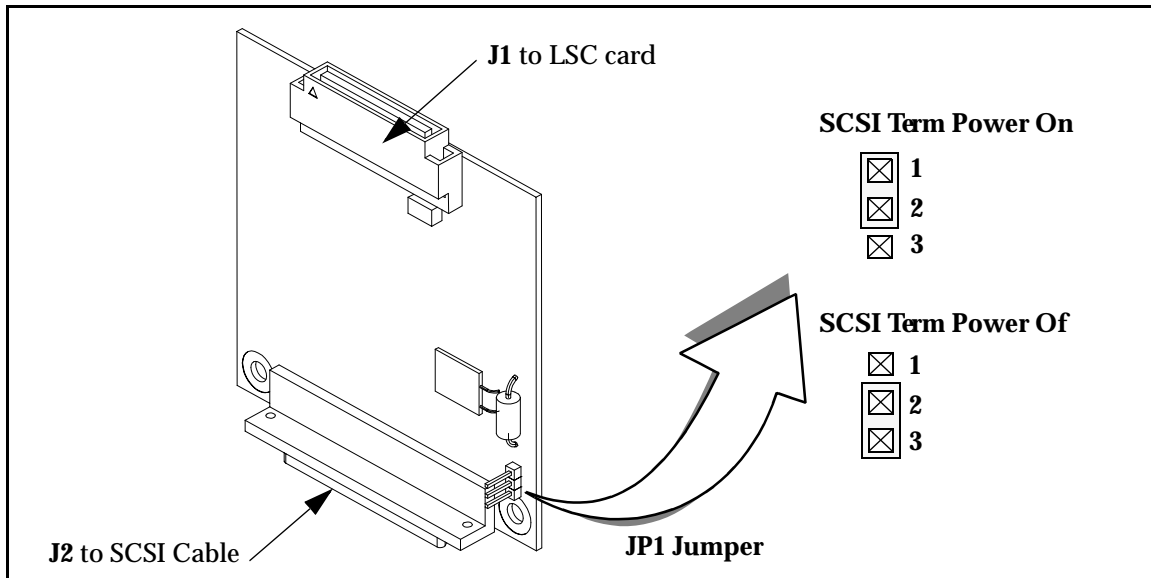


Figure 7-25 LSE1 card

## ■ LAM1 (Accessor Motion) Card

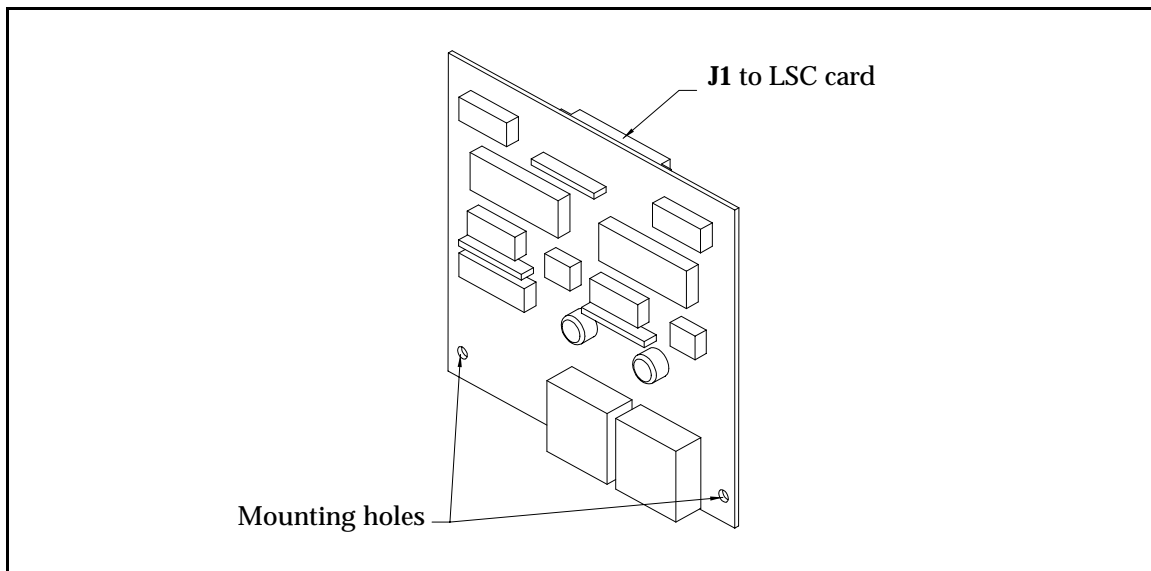
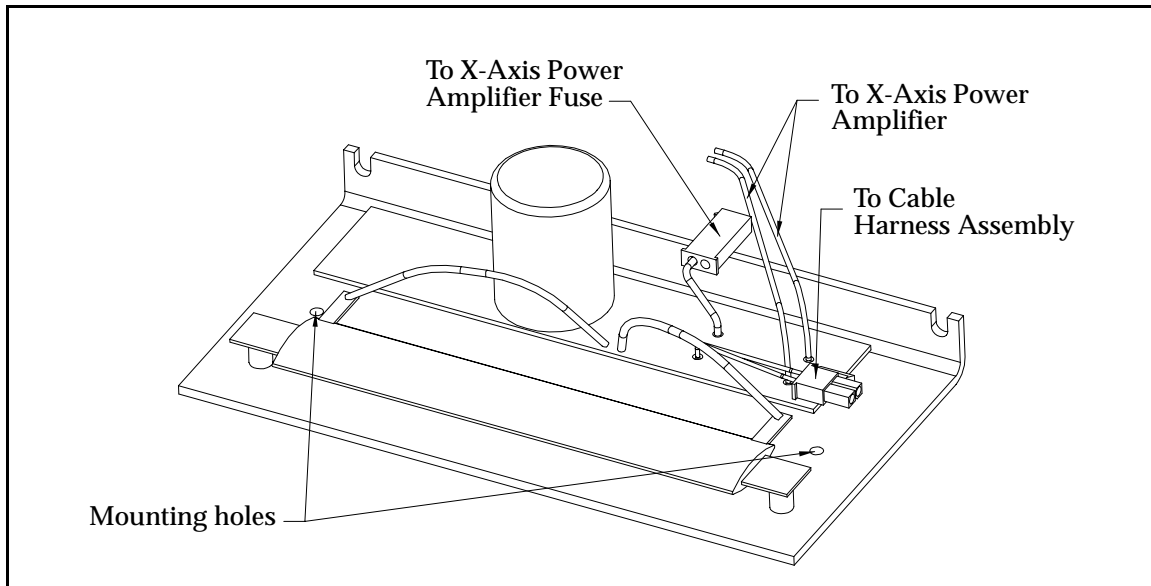


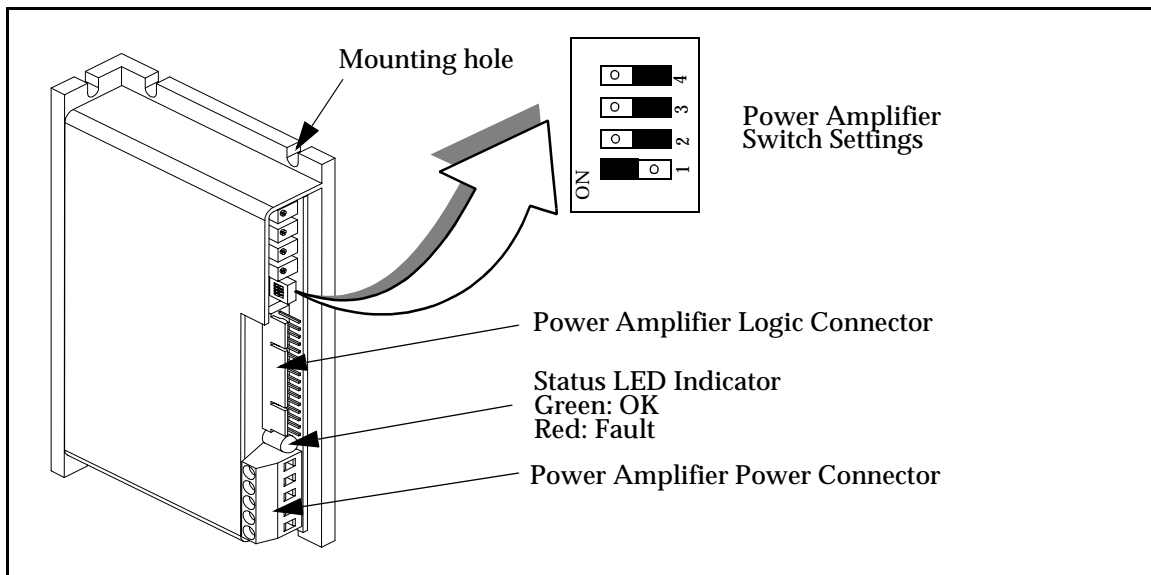
Figure 7-26 LAM1 card

## +48V DC Shunt Regulator



**Figure 7-27** +48V DC Shunt Regulator

## Power Amplifier

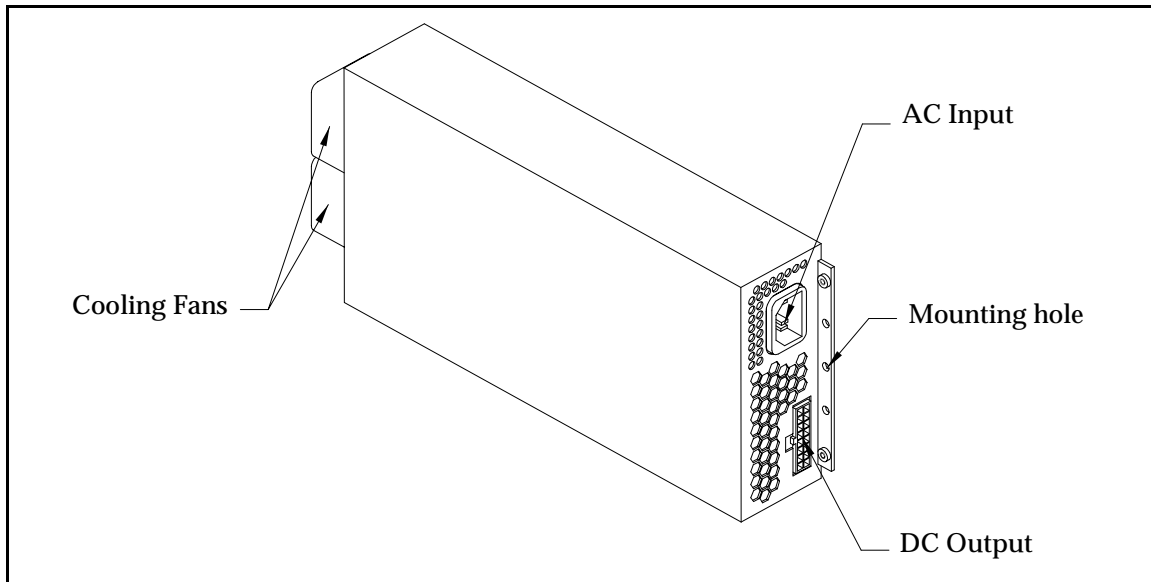


**Figure 7-28** Power Amplifier

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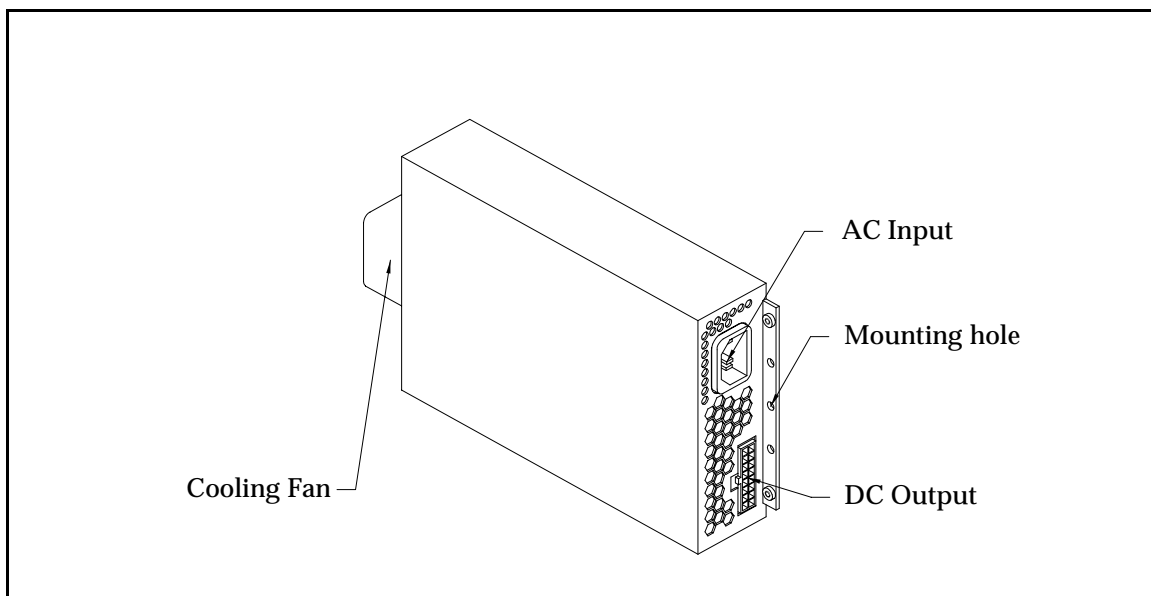
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## **+48V DC Power Supply**



**Figure 7-29**      +48V DC Power Supply

## **+24V DC Power Supply**

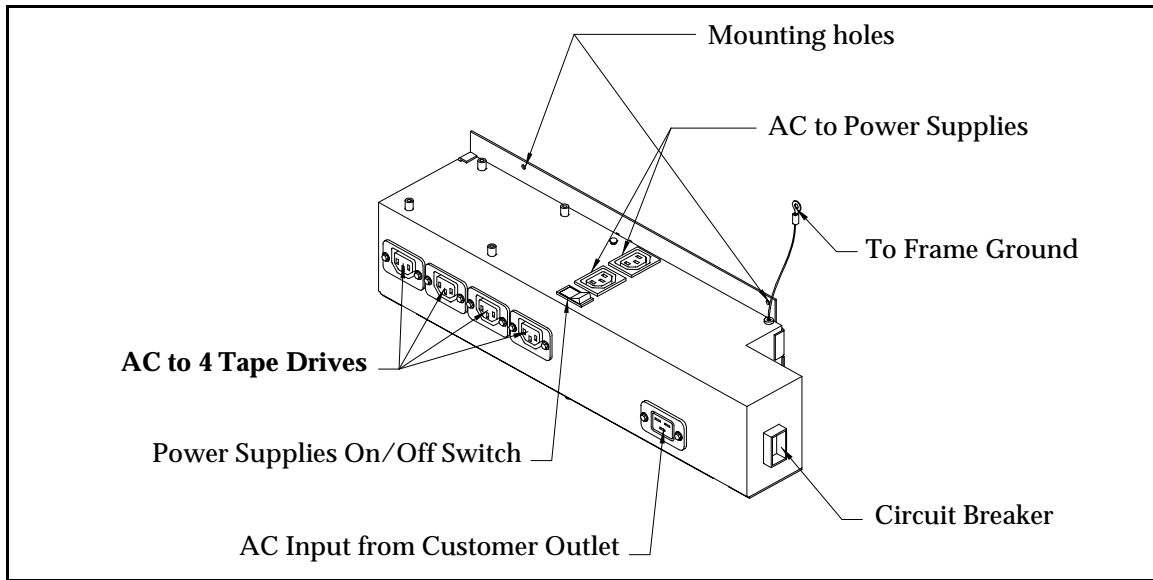


**Figure 7-30**      +24V DC Power Supply

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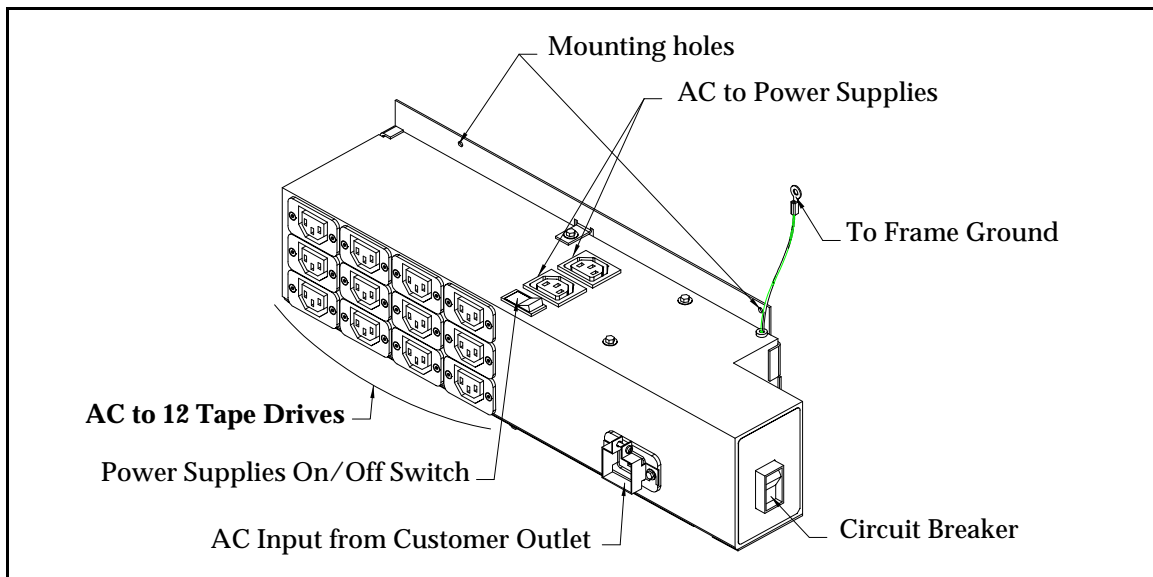
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## AC Power Compartment



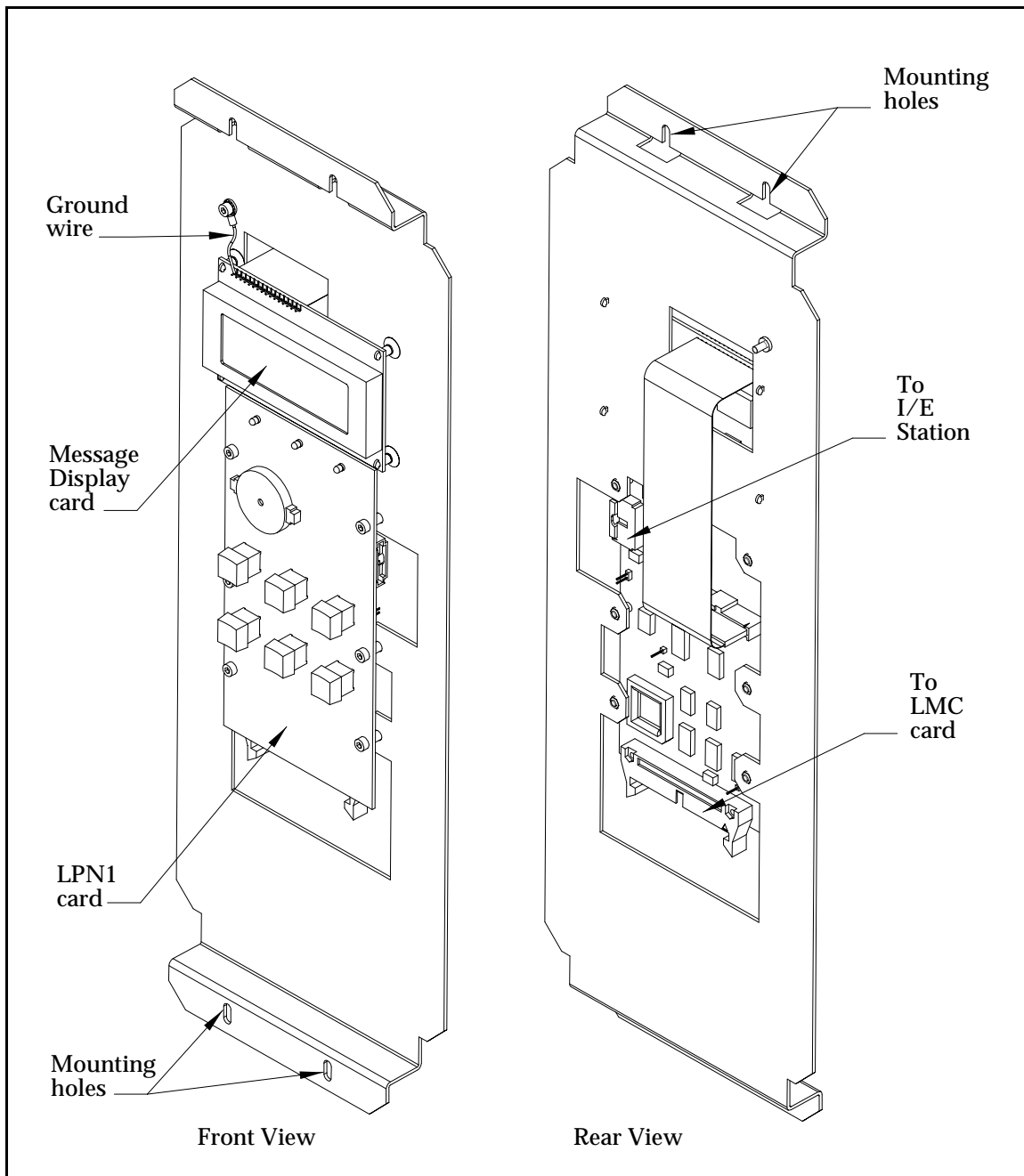
**Figure 7-31** AC Power Compartment - P/N 300830

## AC Power Compartment - New Style



**Figure 7-32** AC Power Compartment - P/N 301430

## Operator Panel Assembly

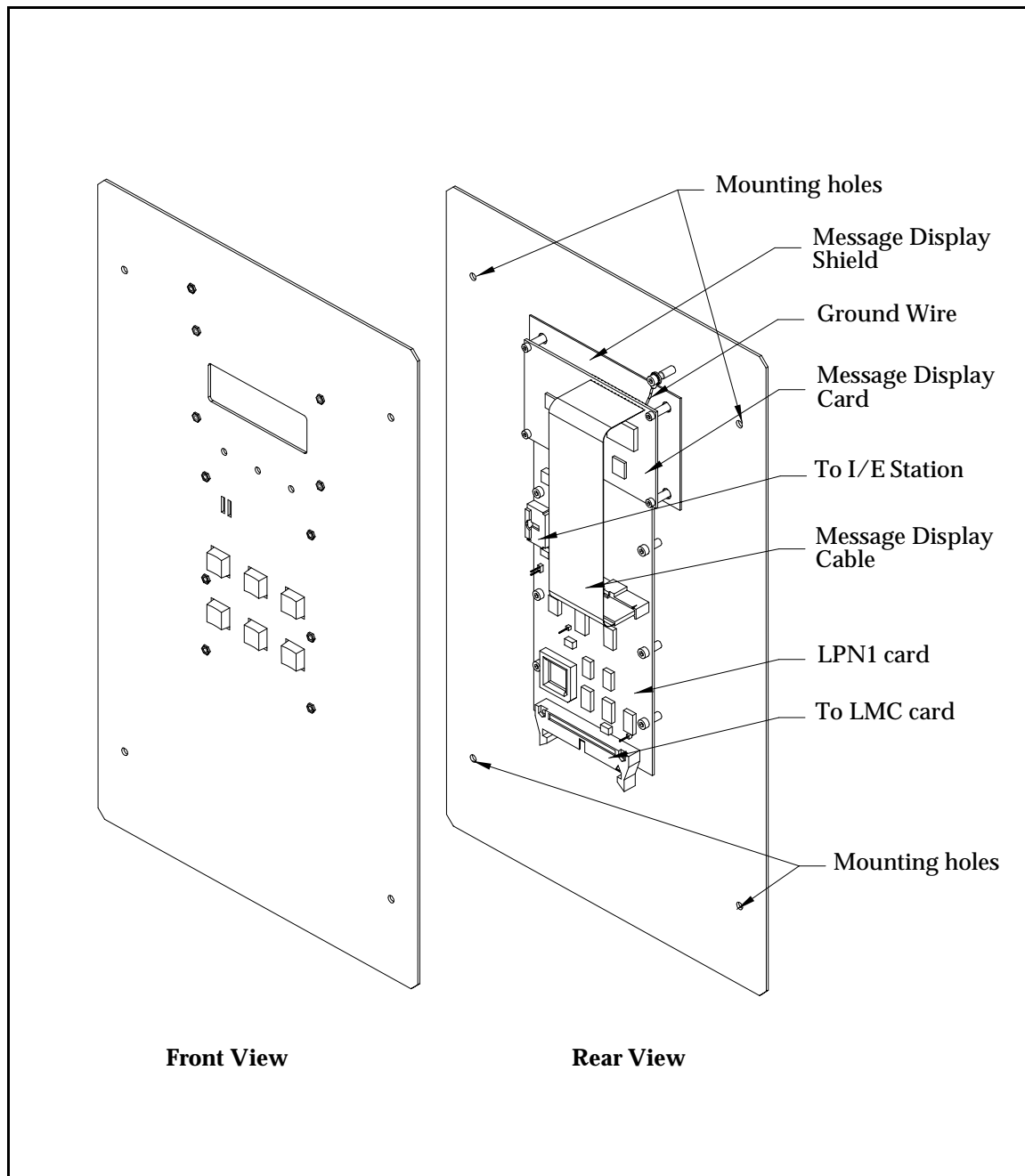


**Figure 7-33** Operator Panel Assembly

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## Operator Panel Assembly - New Style



**Figure 7-34** Operator Panel Assembly - New Style

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# 8

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Replacing the Gripper Flex Cable .....	8-27
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Replacing the Touch Tip Sensor .....	8-28
Gripper Assembly Retract Complete Sensor .....	8-29
Removing the Retract Complete Sensor .....	8-29



Replacing the Retract Complete Sensor .....	8-29
Gripper Assembly Finger Open Sensor .....	8-30
Removing the Finger Open Sensor .....	8-30
Replacing the Finger Open Sensor .....	8-30
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Replacing the Grip card (LGR1) .....	8-32
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Removing the O-rings .....	8-33
Replacing the O-ring .....	8-33
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Removing the X-Axis Drive Belt .....	8-34
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Replacing the X-Axis Moving Cable .....	8-41
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Removing the X-Axis Home Sensor .....	8-42
Replacing the X-Axis Home Sensor .....	8-42
X-Axis Motor .....	8-43
Removing the X-Axis Motor .....	8-43
Replacing the X-Axis Motor .....	8-43
X-Axis Rail Roller .....	8-44
Removing the X-Axis Rail Roller .....	8-44
Replacing the X-Axis Rail Roller .....	8-44
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Removing the X-Rail Assembly .....	8-45
Replacing the X-Rail Assembly .....	8-45
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Replacing the Y-Axis Belt .....	8-49
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Replacing the Y-Axis Home Sensor .....	8-49
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Replacing the LMC Card .....	8-57
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LPN1 (Operator Panel) Card .....	8-58
Removing the LPN1 Card .....	8-58
Replacing the LPN1 Card .....	8-59
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Replacing the I/E Station Locked Assembly .....	8-64
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Replacing the I/E Station Closed Sensor .....	8-65
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Removing the AC Power Compartment .....	8-66
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Removing the Electronics Cover .....	8-80
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## Overview

This section contains step by step procedures to adjust, remove and replace all Scalar 1000 Field Replaceable Units (FRUs). Note that the FRU P/N may not be at the latest level, however, the FRU shipped from the factory will always be at the latest Engineering Change Level.

# FRU (Field Replaceable Unit) List

**Table 8-1** Scalar 1000 FRU List and Part Number

FRU Type	FRU Name	FRU Part Number	FRU ID	Reference Information on Page
Cards	LSC1 (SCSI and Control) Card	200155	10	8-56
	LSC2 (SCSI and Control) Card - <b>New Version</b>	200257	10	8-56
	LMC3 (Machine Control) Card	200210	11	8-57
	LMC3 (Machine Control) Card - <b>New Version (requiring Firmware Level 2.24 or later)</b>	200265	11	8-57
	LPN1 (Operator Panel) Card	200159	12	8-58
	LGR1 (Gripper) Card	200167	13	8-32
	LDF1 (SCSI Differential) Card	200151	14	8-57
	LSE1 (SCSI Single Ended) Card	200183	15	8-57
	LVD1 (SCSI Low Voltage Differential) Card	200275		8-57
	LYP1 (Connector) Card	200220	16	8-60
	LBI1 (Library Interface) Card	200175	17	8-60
	LBI2 (Library Interface) Card - <b>New Version</b>	200215	17	8-60
	SCSI Differential Terminator	106514	18	
	SCSI Single Ended Terminator	106620	19	
	SCSI Low Voltage Differential (LVD) Terminator	60-3020-01		
	LAM1 (Accessor Motion) Card	200261	1A	8-61
	LCD (Display) Card	107063	1B	8-59
	Library Interlock Terminator Car	300862	1C	8-60

**Table 8-1**      Scalar 1000 FRU List and Part Number

<b>FRU Type</b>	<b>FRU Name</b>	<b>FRU Part Number</b>	<b>FRU ID</b>	<b>Reference Information on Page</b>
<b>Solenoids/Sensors</b>	Insert/Eject Station Locked Assembly	301482	20	8-63
	Insert/Eject Station Closed Sensor	106314	31	8-64
	Gripper Retract Complete Sensor	106314	32	8-29
	GripperTouch Tip Sensor	106314	33	8-28
	Gripper Finger Open Sensor	106314	34	8-30
	GripperTach Sensor	106314	35	8-31
	X-Axis Home Sensor	106314	36	8-42
	Y-Axis Home Sensor	106314	37	8-49
<b>Power</b>	+48V DC Power Supply	106922	50	8-68
	+24V DC Power Supply	106923	51	8-67
	X-Axis Power Amplifier	106909	52	8-61
	Y-Axis Power Amplifier	106909	53	8-61
	AC Power Compartment (old style)	300830	54	8-66
	AC Power Compartment (new style)	301430	54	8-66
	Barcode Scanner	301166	55	8-21
	Shunt Regulator	300872	57	8-69
<b>Fuses</b>	2 Amp Fuse (used on LMC card)	106834		7-20
	4 Amp Fuse (used on Power Amplifier)	107083		7-17
	7 Amp Fuse (used on LMC card)	106836		7-20

**Table 8-1**      Scalar 1000 FRU List and Part Number

FRU Type	FRU Name	FRU Part Number	FRU ID	Reference Information on Page
Mechanical Assemblies	X-Axis Motor	301081	40	8-43
	Y-Axis Motor	301081	41	8-53
	Gripper Assembly	301165	70	8-24
	X-Rail Assembly	301085	71	8-45
	Accessor Assembly	301083	73	8-47
	Belt Tensioner Assembly	301086	74	7-8
	X-Axis Rail Roller	301182	76	8-44
	Y-Axis Rail Roller	301082	77	8-51
	Storage Assembly (1x10) - .5 inch type	301045	78	8-54
	Storage Assembly (1x12) - .5 inch type	301040	79	8-54
	Storage Assembly (4x12) - .5 inch type	301041	7A	8-54
	Storage Assembly (5x10) - .5 inch type	301042	7B	8-54
	Storage Assembly (5x12) - .5 inch type	301044	7C	8-54
	Storage Assembly (1x10) - DLT type	301345	78	8-54
	Storage Assembly (1x12) - DLT type	301340	79	8-54
	Storage Assembly (4x12) - DLT type	301341	7A	8-54
	Storage Assembly (5x10) - DLT type	301342	7B	8-54
	Storage Assembly (5x12) - DLT type	301344	7C	8-54
	Storage Assembly (1x12) - Mixed (I/E Station)	301347	7D	8-54
	Storage Assembly (1x15) - AIT type	301236		8-54
	Storage Assembly (1x18) - AIT type	301234		8-54
	Storage Assembly (4x18) - AIT type	301233		8-54
	Storage Assembly (5x15) - AIT type	301235		8-54
	Storage Assembly (5x18) - AIT type	301237		8-54

**Table 8-1**      Scalar 1000 FRU List and Part Number

FRU Type	FRU Name	FRU Part Number	FRU ID	Reference Information on Page
<b>Belts</b>	X-Axis Drive Belt	106356	80	8-34
	X-Axis Belt (One Frame Library)	301069	81	8-35
	X-Axis Belt (Two Frame Library)	301070	81	8-35
	X-Axis Belt (Three Frame Library)	301071	81	8-35
	X-Axis Belt (Four Frame Library)	301072	81	8-35
	Y-Axis Belt	301073	82	8-48
<b>Misc.</b>	Library Door Interlock Switch	106316	90	8-79
	Library Front Door Key	106352	91	
	Library Rear Door Key	106351	92	
	Drive Shaft Dampener	301074		8-71
	O-ring	106410		8-33

**Table 8-1** Scalar 1000 FRU List and Part Number

FRU Type	FRU Name	FRU Part Number	FRU ID	Reference Information on Page
Labels	8590 Drive Fiducial	301032	Label Decode = %05	
	3610 Drive Fiducial	301033	Label Decode = %06	
	DLT 4000 Drive Fiducial (Model 4001)	301332	Label Decode = %15	
	DLT 4000 Drive Fiducial (Model 4001S) (order new label to match the old one)	301362	Label Decode = %17	
		301464	Label Decode = %1D	
	DLT 7000 Drive Fiducial (Model 7001)	301333	Label Decode = %16	
	DLT 7000/8000 Drive Fiducial (Model 7001S/8001S) (order new label to match the old one)	301363	Label Decode = %16	
		301465	Label Decode = %1E	
	AIT 3102/5002 Drive Fiducial	301240	Label Decode = %25	
	1x12 Half-inch Storage Array Fiducial (order new label to match the old one)	301035	Label Decode = %04	
		301262	Label Decode = %0C	
	4x12 Half-inch Storage Array Fiducial (order new label to match the old one)	301036	Label Decode = %00	
		301263	Label Decode = %0A	
	5x12 Half-inch Storage Array Fiducial (order new label to match the old one)	301037	Label Decode = %01	
		301264	Label Decode = %0B	
	5x10 Half-inch Storage Array Fiducial	301038	Label Decode = %02	
	1x10 Half-inch Storage Array Fiducial	301039	Label Decode = %03	
	1x12 DLTStorage Array Fiducial (order new label to match the old one)	301335	Label Decode = %14	
		301265	Label Decode = %1C	
	4x12 DLTStorage Array Fiducial (order new label to match the old one)	301336	Label Decode = %10	
		301266	Label Decode = %1A	
	5x12 DLTStorage Array Fiducial (order new label to match the old one)	301337	Label Decode = %11	
		301267	Label Decode = %1B	
	5x10 DLTStorage Array Fiducial	301338	Label Decode = %12	
	1x10 DLTStorage Array Fiducial	301339	Label Decode = %13	

**Table 8-1**      Scalar 1000 FRU List and Part Number

FRU Type	FRU Name	FRU Part Number	FRU ID	Reference Information on Page
Labels	1x12 Mixed Media Storage Array Fiducial (order new label to match the old one)	301364	Label Decode = %M5	
		301280	Label Decode = %MC	
	1x15 AIT Storage Array Fiducial	301231	Label Decode = %23	
	1x18 AIT Storage Array Fiducial	301229	Label Decode = %2C	
	4x18 AIT Storage Array Fiducial	301228	Label Decode = %2A	
	5x15 AIT Storage Array Fiducial	301230	Label Decode = %22	
	5x18 AIT Storage Array Fiducial	301232	Label Decode = %2B	

**Table 8-1**      Scalar 1000 FRU List and Part Number

FRU Type	FRU Name	FRU Part Number	FRU ID	Reference Information on Page
Cables (See Note at the end of the Table)	Insert/Eject Station Cable	300846	A0	10-3
	Operator Panel Cable	300845	A1	10-3
	X-Axis moving cable (1 or 2 Frame Lib.)	301457	A2	10-3
	X-Axis moving cable (3 or 4 Frame Lib.)	301458	A2	10-3
	Y-Axis moving cable	301459	A3	10-3
	X-Axis Motor cables (Servo & Signal)	300836 & 300837	A4	10-3
	X-Axis Home Sensor Cable	300852	A5	10-3
	Y-Axis Home Sensor Cable	300853	A7	10-3
	Gripper Assembly Fixed Cable	300840	A9	10-3
	LBI1 Interlock Cable (CM frame))	300848	AA	10-3
	LBI1 Interlock Cable (EM frame)	300849	AB	10-3
	LBI2 Interlock Cable (CM frame))	301423		10-3
	LBI2 Interlock Cable (EM frame)	301422		10-3
	AC Line cord (USA) AC Line cord (Germany) AC Line cord (International)	107028 107072 106418	AC	10-3
	Power Amps. Power Cable (Model C10) Power Amps. Power Cable (Model C20 & C30)	300842 301414	AD	10-3
	Power Amps. Logic Cable (Model C10) Power Amps. Logic Cable (Model C20 & C30)	300844 301416	AE	10-3
	Gripper Assembly Flex Cable	300841	AF	8-27
	AC Power to Drive cable	106111		10-3
	AC Power to DC Power supplies Cable (New style)	107026 106423	B1	10-3
	+24V DC P/S Distribution (Model C10) +24V DC P/S Distribution (Model C20 & C30)	300847 301417	B4	10-3
	+48V DC P/S Distribution (Model C10) +48V DC P/S Distribution (Model C20 & C30)	300843 301415	B5	10-3

**Table 8-1**      Scalar 1000 FRU List and Part Number

FRU Type	FRU Name	FRU Part Number	FRU ID	Reference Information on Page
<b>Cables</b> (See Note)	X-Axis Fixed Cable 1	300838	B6	10-3
	X-Axis Fixed Cable 2	300839	B7	10-3
	Drive Communication Cable (Old Style)	301424		
	Drive Communication Cable (New Style)	301438		

**Note:** When replacing a cable that has a ferrite, always move the ferrite from the failed cable to the new one.

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## Cartridge Removal from Cartridge Accessor

Refer to Figure 8-1 on page 8-15.

- Step 1** Put the Library in a “Not Ready” state by pressing the Ready button on the Operator Panel.
- Step 2** Open the front door of the Control Module.
- Step 3** Perform Procedure *Y-Axis (Vertical) Service Position* on page 8-15.
- Step 4** Slide open the Insert/Eject Station.
- Step 5** Move the Accessor assembly along the X-axis so that the Gripper Assembly is directly in front of the opening vacated by the Insert/Eject station.
- Step 6** Remove the cartridge by wiggling it out of the grip fingers.
- Step 7** Return the Library to operational condition.

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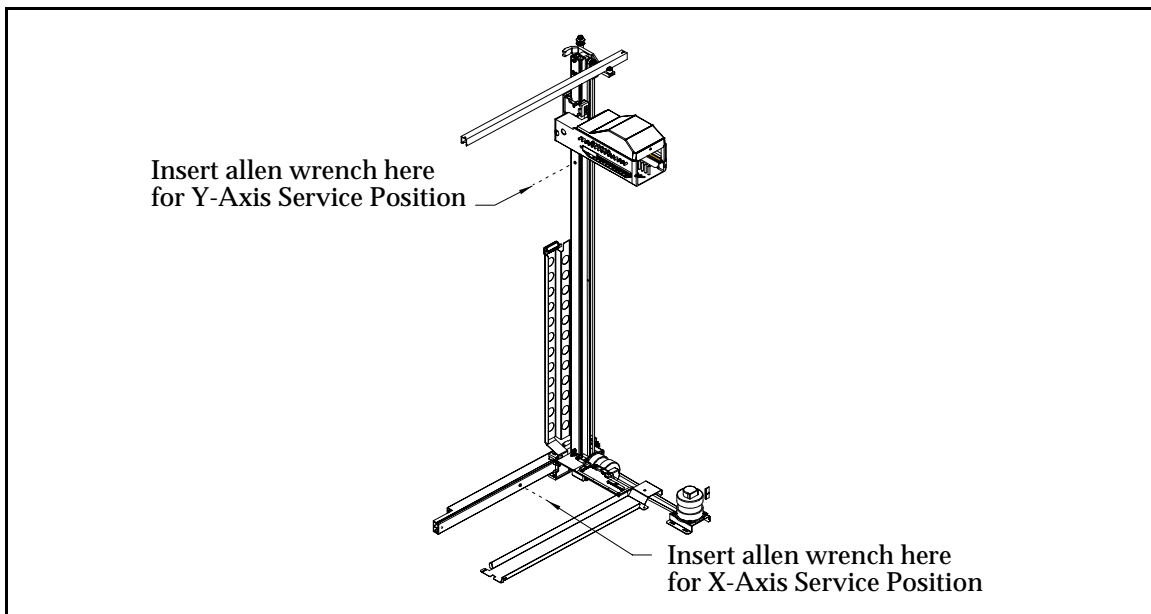
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## Cartridge Accessor Service Position

The **service position** secures the cartridge accessor in place while you work on the Library. Figure 8-1 below shows the cartridge accessor in both the X-Axis and Y-Axis service positions.

### Y-Axis (Vertical) Service Position

- Step 1** Perform Procedure *Prepare for Service* on page 5-4, and then return here.
- Step 2** Lift the gripper assembly to the service position and insert an allen wrench in the opening on the right side of the Y-Axis (vertical) assembly.



**Figure 8-1** Cartridge Accessor X (Horizontal) and Y (Vertical) Service Position

### X-Axis (Horizontal) Service Position

- Step 1** Perform Procedure *Prepare for Service* on page 5-4, and then return here.
- Step 2** Move the accessor to the left of the Control Module frame. Insert an allen wrench in the hole in the X-Axis (horizontal) assembly.

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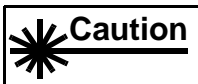
## Tape Drive Service Position

### Procedure to put 3590 type Tape drives in Service Position

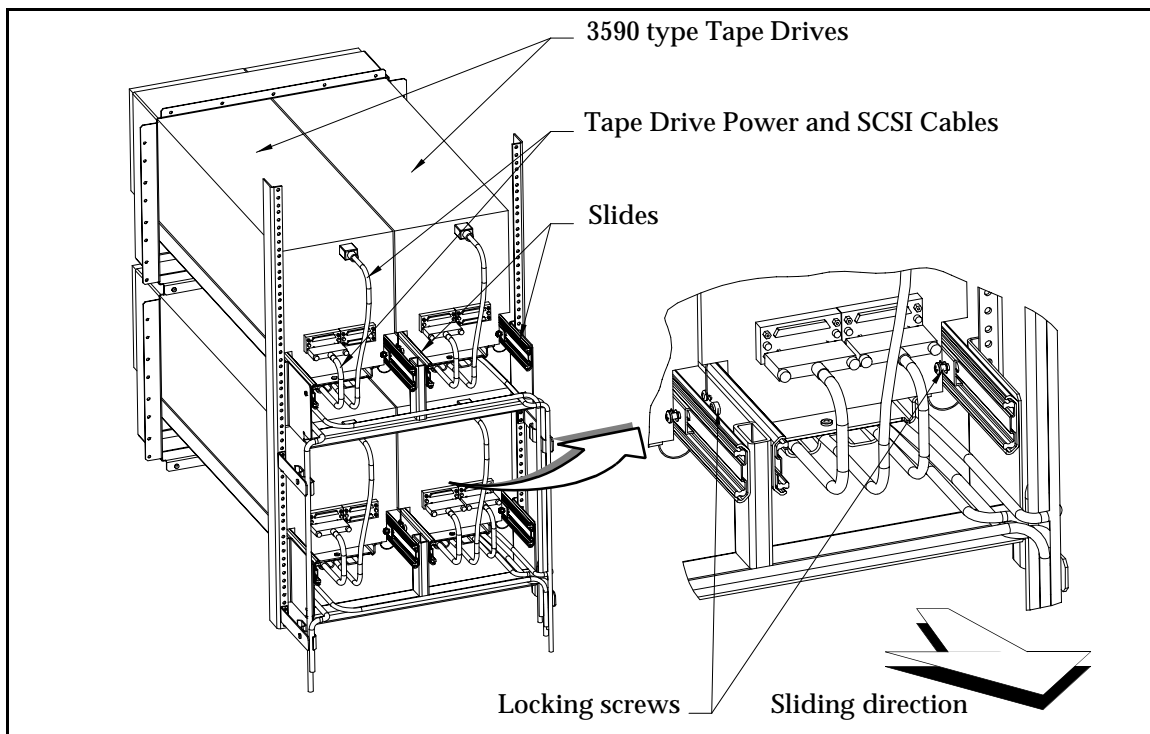
See Figure 8-2.

**Disable the Scalar 1000 Auto Teach function (Main Menu >Setup >Library >Advanced) prior to putting the drive in service position. Enable this function after servicing the drive.**

- Step 1** Open the rear door of the frame containing the drive requiring service.
- Step 2** Remove the 2 locking screws from the drive slides and slide the drive out until the slides lock in place.



**The Scalar 1000 Barcode Scanner is powered on when the tape drive is in the service position. Use proper caution and do not look directly at the laser beam.**



**Figure 8-2** 8590 Tape Drive Service Position

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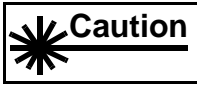
## Procedure to put 8490E or NCTP Tape drives in Service Position

See Figure 8-3 below:

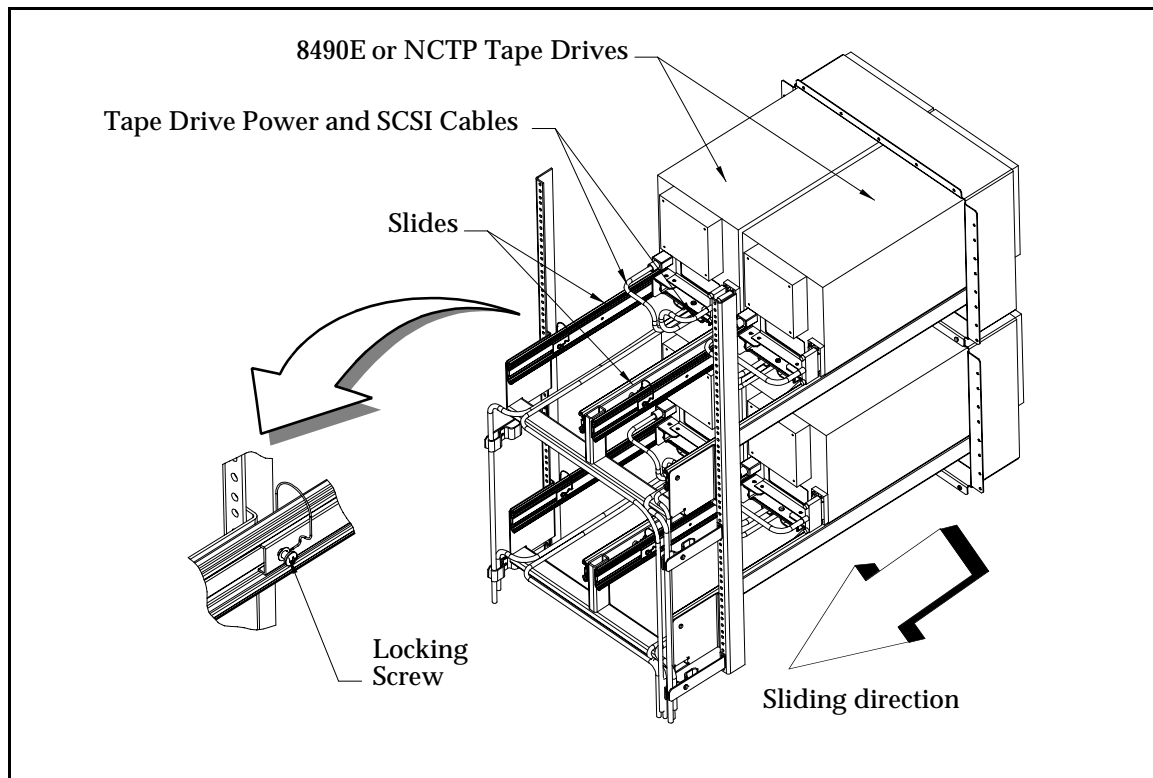
**Disable the Scalar 1000 Auto Teach function (Main Menu >Setup >Library >Advanced) prior to putting the drive in service position. Enable this function after servicing the drive.**

**Step 1** Open the rear door of the frame containing the drive requiring service.

**Step 2** Remove the 2 locking screws from the drive slides and slide the drive out until the slides lock in place.



**The Scalar 1000 Barcode Scanner is powered on when the tape drive is in the service position. Use proper caution and do not look directly at the laser beam.**



**Figure 8-3** 8490E Tape Drive Service Position

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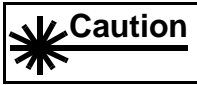
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## Procedure to put DLT drive (Models 4001 & 7001) in Service Position

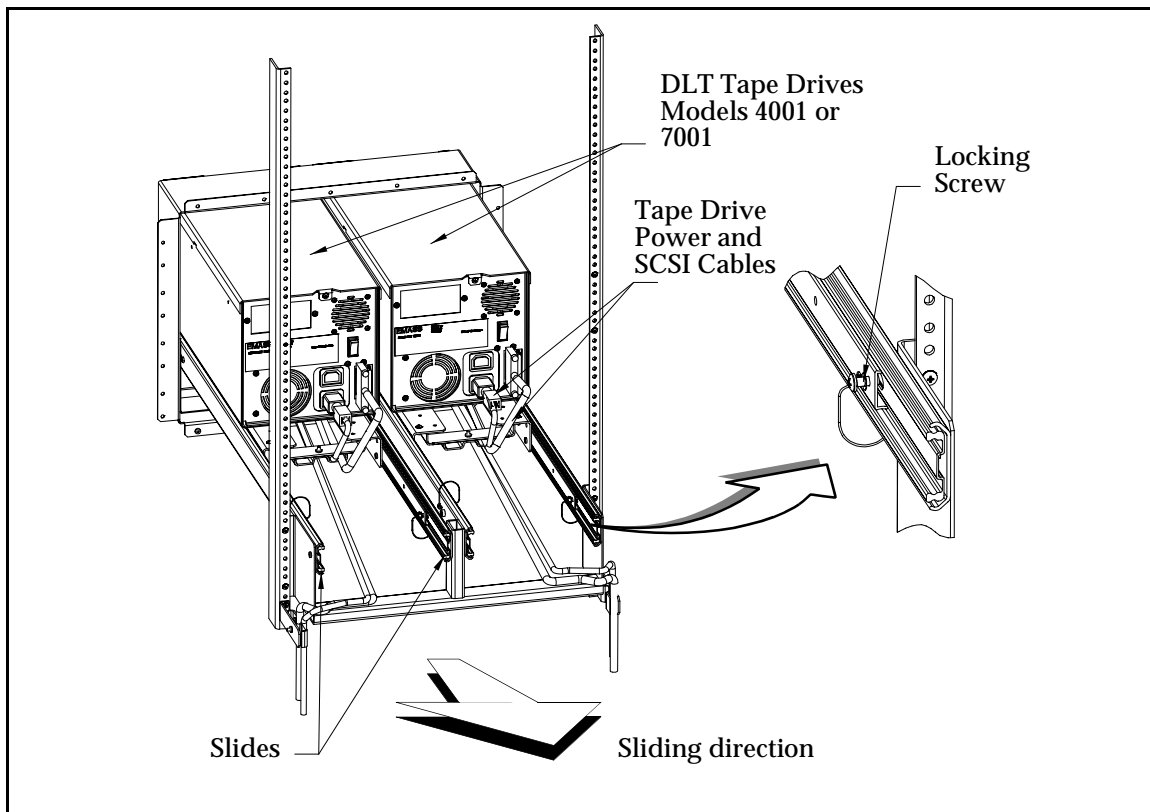
See Figure 8-4 below:

**Disable the Scalar 1000 Auto Teach function (Main Menu >Setup >Library >Advanced) prior to putting the drive in service position. Enable this function after servicing the drive.**

- Step 1** Open the rear door of the frame containing the drive requiring service.
- Step 2** Remove the 2 locking screws from the drive slides and slide the drive out until the slides lock in place.



**The Scalar 1000 Barcode Scanner is powered on when the tape drive is in the service position. Use proper caution and do not look directly at the laser beam.**



**Figure 8-4** DLT Tape Drive (Models 4001 or 7001) Service Position

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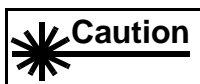
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## Procedure to put DLT (Models 4001S, 7001S & 8001S) in Service Position

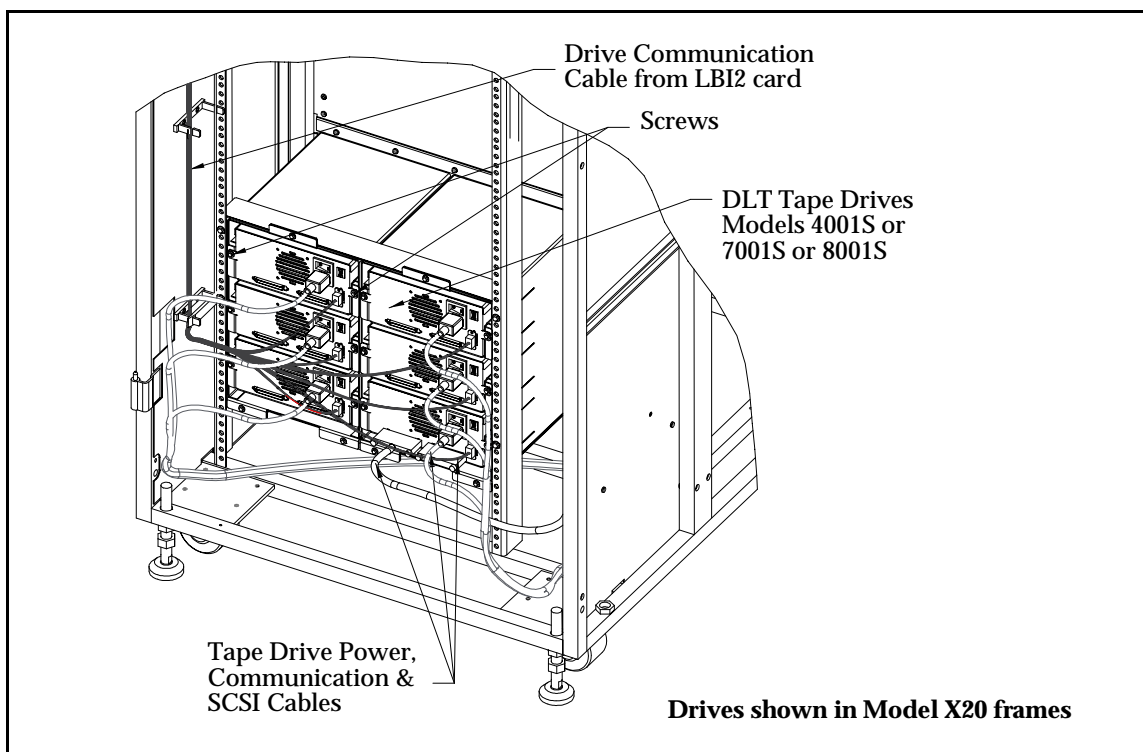
See Figure 8-5 below:

**Disable the Scalar 1000 Auto Teach function (Main Menu >Setup >Library >Advanced) prior to putting the drive in service position. Enable this function after servicing the drive.**

- Step 1** Open the rear door of the frame containing the drive requiring service.
- Step 2** Disconnect all cables (Power, SCSI, Drive communication) from the drive.
- Step 3** Remove the 2 screws that fasten the drive to the mounting bay and remove the drive.



**The Scalar 1000 Barcode Scanner is powered on when the tape drive is in the service position. Use proper caution and do not look directly at the laser beam.**



**Figure 8-5** DLT Tape Drive (Models 4001S/7001S/8001S) Service Position

## Procedure to put AIT drives (Model 3102 or 5002) in Service Position

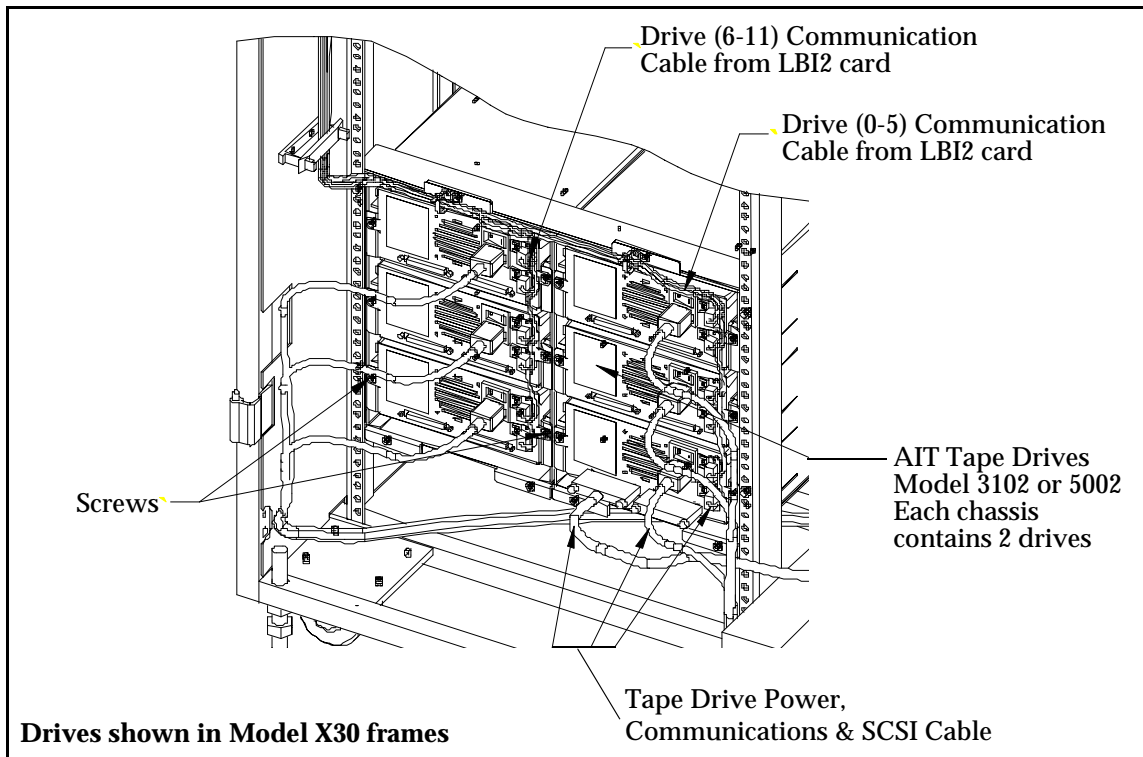
See Figure 8-6 below:

**Disable the Scalar 1000 Auto Teach function (Main Menu >Setup >Library >Advanced) prior to putting the drive in service position. Enable this function after servicing the drive.**

- Step 1** Open the rear door of the frame containing the drives requiring service.
- Step 2** Disconnect all cables (Power, SCSI, Drive communication) from the drive chassis.
- Step 3** Remove the 2 screws that fasten the drive to the mounting bay and remove the drive chassis.



**The Scalar 1000 Barcode Scanner is powered on when the tape drive is in the service position. Use proper caution and do not look directly at the laser beam.**



**Figure 8-6** AIT Tape Drives (Models 3102 or 5002) Service Position

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## Barcode Scanner Assembly

The Barcode Scanner Assembly Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8, Figure 7-9 on page 7-11 and Figure 8-7 on page 8-24 for locations of the components in the following procedure:

### Removing the Barcode Scanner

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Remove the 2 M3x10 screws on the Y-Axis Flex cable clamp.
- Step 3** Removing Gripper cover by removing the M3x10 screw located at the front of the cover.

**Note:** Before replacing the Barcode Scanner, clean the Barcode Scanner window with a clean, dry Q-tip or cotton cloth and retry the failing operation.

- Step 4** Disconnect the cable from the Barcode Scanner to the LGR1 card.
- Step 5** Remove the 2 screws holding the Barcode Scanner to the bracket.
- Step 6** Remove the Barcode Scanner.

### Replacing the Barcode Scanner

Perform the above procedure in reverse order.

Check to make sure that the Barcode Scanner beam is horizontal by performing the following procedure:

- Step 1** Use the Operator Panel to set the Library in **Offline** and **Ready** states (Main Menu >Mode).
- Step 2** Execute the "Barcode Scanner Adjustment" routine from the Operator panel to position the Barcode Scanner in front of a reference barcode (Main Menu

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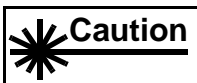
>Service >Diags >Scanner >Adjust). This function turns the Barcode scanner On.

- Step 3** Use >Diags >Accessor >Step function to step the Gripper Assembly horizontally in both directions to ensure that the scan beam stays horizontal across the barcode label (select 10 mm for each increment).
- Step 4** If the scan beam is not horizontal, perform procedure *Barcode Scanner Assembly Adjustment* on page 8-24.
- Step 5** Use the Operator Panel to reteach the Library (Main Menu >Service >Teach >Teach New).

## Adjusting the Barcode Scanner

Refer to Figure 7-18 on page 7-20 for locations of components in the following steps:

- Step 1** Remove the LBI terminator from the last frame of the Scalar 1000. This action has the same effect as opening the Library front door(s) so servo power will be turned OFF, ignore the “Intervention Needed” message on the Operator panel.
- Step 2** Disconnect the LBI cable from the J7 connector on the LMC card and install the LBI terminator in its position. This action puts the Library in Service Mode which limits the accessor movements.
- Step 3** Use the Operator Panel to set the Library in **Offline** and **Ready** states (Main Menu >Mode).
- Step 4** Execute the “Barcode Scanner Adjustment” routine from the Operator panel to position the Barcode Scanner in front of a reference barcode (Main Menu >Service >Diags >Scanner >Adjust). This function turns the Barcode scanner on so it can be adjusted dynamically.
- Step 5** Open the front door of the Control Module and remove the Gripper Assembly Cover by removing the M3x10 screw located at the front of the cover.

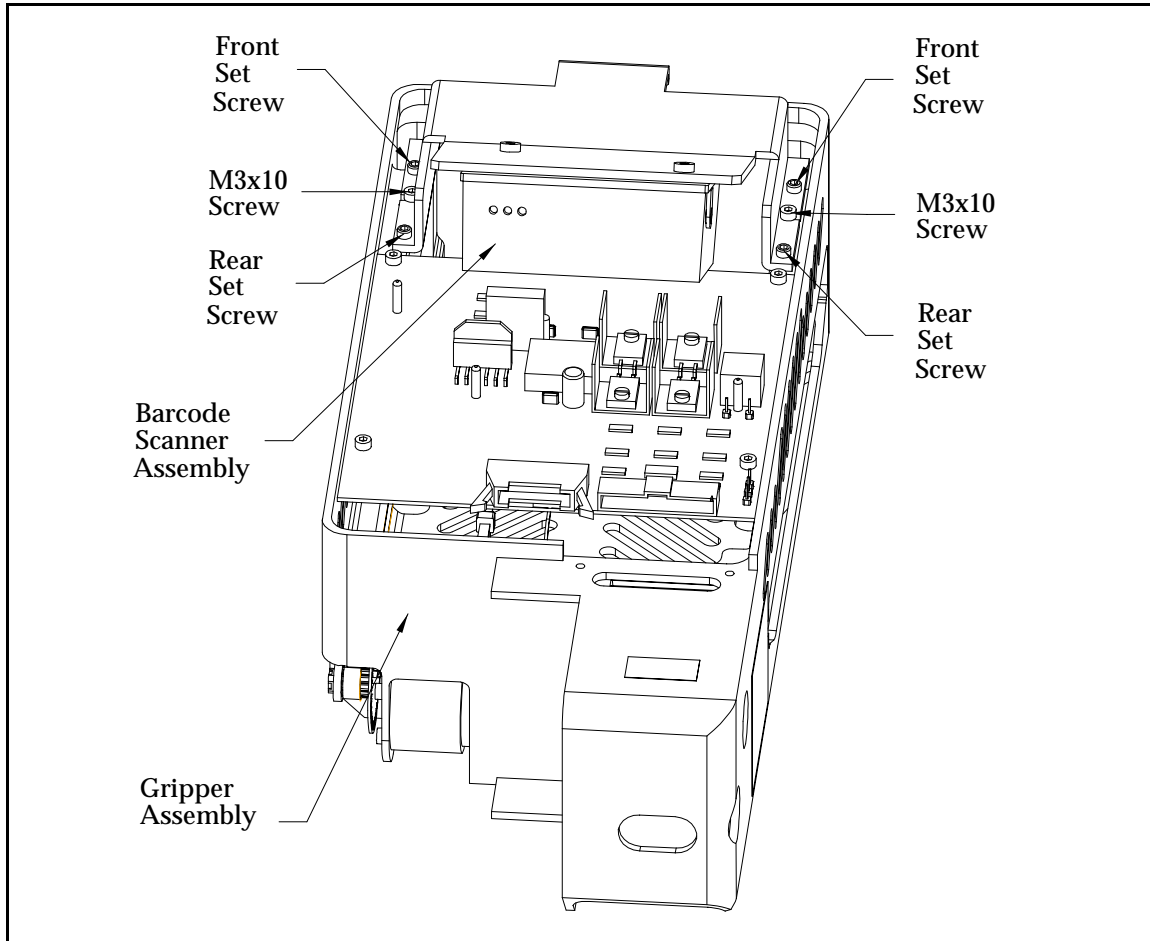


**The Scalar 1000 Barcode Scanner is powered on during this procedure. Use proper caution and do not look directly at the laser beam. The following warning label pertained to the Barcode scanner.**



Refer to Figure 8-7 on page 8-24 for locations of components in the following steps:

- Step 6** Loosen the 2 M3x10 screws that fasten the barcode scanner assembly to the Gripper assembly. Do not remove these screws.
- Step 7** Adjust the two front set screws and one of the rear set screw to align the scan beam to a horizontal position.
- Step 8** Once the scan beam is horizontal to the barcode, lower the remaining set screw so it touches the gripper base.
- Step 9** Tighten the Barcode Scanner Assembly to the Gripper base with the 2 M3x10 screws. Use >Diags >Accessor >Step function to step the Gripper Assembly horizontally in both directions to ensure that the scan beam stays horizontal across the barcode label (select 10 mm for each increment).
- Step 10** Reinstall the Gripper Assembly cover and restore the Library Interlock circuit (LBI cable and terminator) to their original positions.



**Figure 8-7** Barcode Scanner Assembly Adjustment

## **Gripper Assembly**

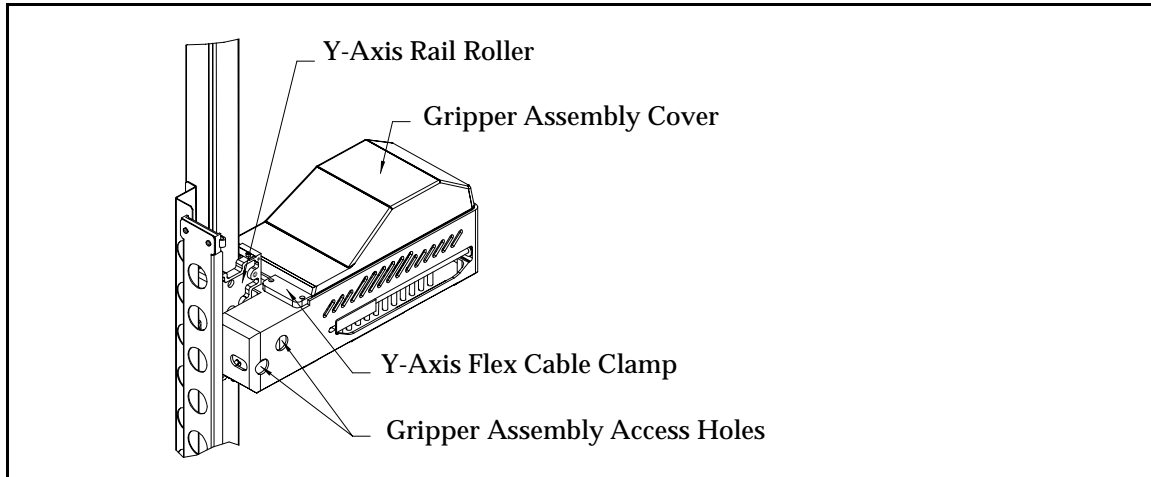
The Gripper Assembly Part Number can be found on Table 8-1 on page 8-6.

See Figure 7-6 on page 7-8 and Figure 7-9 on page 7-11 for general views of the components in the following procedure:

## **Removing the Gripper Assembly**

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.

- 
- 
- Step 2** Remove the 2 M3x10 screws on the Y-Axis Flex cable clamp.
- Step 3** Remove the Gripper Assembly Cover by removing the M3x10 screw located at the front of the cover.



**Figure 8-8** Gripper Assembly Removal and Replacement

- Step 4** Disconnect the Y-Axis Flex cable from the LGR1 card.
- Step 5** Remove the 2 M6x12 screws holding the Gripper Assembly to the Y-Axis Rail Roller. Use the access holes on the Gripper Assembly to reach these screws.
- Step 6** Remove the Gripper Assembly.

**Important Note:** If this Gripper Assembly is from a Library containing AIT cartridges, remove the two AIT Gripper Finger Adapters, Finger Plates and Screws as shown in Figure 7-10 on page 7-12. Save these parts to be used on the new Gripper Assembly.

## Replacing the Gripper Assembly

Perform the above procedure in reverse order.

**Note:** If you are replacing the Gripper Assembly for the C30 Model (AIT cartridge), remove the two yellow pads from the Gripper Fingers of the new Gripper Assembly before attaching the AIT Gripper Finger Adapters.

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Check to make sure that the Barcode Scanner beam is horizontal by performing the following procedure:

- Step 1** Use the Operator Panel to set the Library in **Offline** and **Ready** states (Main Menu >Mode).
- Step 2** Execute the “Barcode Scanner Adjustment” routine from the Operator panel to position the Barcode Scanner in front of a reference barcode (Main Menu >Service >Diags >Scanner >Adjust). This function turns the Barcode scanner On.
- Step 3** Use >Diags >Accessor >Step function to step the Gripper Assembly horizontally in both directions to ensure that the scan beam stays horizontal across the barcode label (select 10 mm for each increment).
- Step 4** If the scan beam is not horizontal, perform procedure *Barcode Scanner Assembly Adjustment* on page 8-24.
- Step 5** Use the Operator Panel to reteach the Library (Main Menu >Service >Teach >Teach New).

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## Gripper Assembly Flex Cable

The Gripper Assembly Flex Cable Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-9 on page 7-11 for locations of components in the following procedure:

### Removing the Gripper Flex Cable

#### **Note**

It is easier to replace the cable if you remove the Gripper Assembly first (use Procedure on page 8-24) and place the Gripper Assembly on a flat surface to work on.

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Remove the 2 M3x10 screws on the Y-Axis Flex cable clamp.
- Step 3** Remove the Gripper Assembly Cover by removing the M3x10 screw located at the front of the cover.
- Step 4** Perform Procedure *Removing the Grip card (LGR1)* on page 8-32 and return here.
- Step 5** Remove the two screws holding the cable clamp to the Gripper Assembly.
- Step 6** Carefully observe the cable position within the Gripper Assembly before disconnecting it from the Touch Tip sensor, Finger Open sensor and Gripper Solenoid, this is useful in replacing the cable.
- Step 7** Remove the Gripper Assembly Flex Cable.

### Replacing the Gripper Flex Cable

Perform the above procedure in reverse order. **Be sure the cable is securely attached to the LGR1 card with a new tie-wrap.**

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## Gripper Assembly Touch Tip Sensor

The Gripper Assembly Touch Tip Sensor Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-9 on page 7-11 for locations of components in the following procedure:

### Removing the Touch Tip Sensor

#### **Note**

It is easier to replace the sensor if you remove the Gripper Assembly first (use Procedure on page 8-24) and place the Gripper Assembly on a flat surface to work on.

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Remove the 2 M3x10 screws on the Y-Axis Flex cable clamp.
- Step 3** Remove the Gripper Assembly Cover by removing the M3x10 screw located at the front of the cover.
- Step 4** Perform Procedure *Removing the Grip card (LGR1)* on page 8-32 and return here.
- Step 5** Remove the M3x10 screw holding the Touch Tip sensor to the Gripper base.
- Step 6** Disconnect the cable to the Touch Tip sensor.
- Step 7** Remove the Touch Tip Sensor.

### Replacing the Touch Tip Sensor

Perform the above procedure in reverse order.

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## Gripper Assembly Retract Complete Sensor

The Gripper Assembly Retract Complete Sensor Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-9 on page 7-11 for locations of components in the following procedure:

### Removing the Retract Complete Sensor

#### **Note**

It is easier to replace the sensor if you remove the Gripper Assembly first (use Procedure on page 8-24) and place the Gripper Assembly on a flat surface to work on.

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Remove the 2 M3x10 screws on the Y-Axis Flex cable clamp.
- Step 3** Remove the Gripper Assembly Cover by removing the M3x10 screw located at the front of the cover.
- Step 4** Perform Procedure *Removing the Grip card (LGR1)* on page 8-32 and return here.
- Step 5** Remove the M3x10 screw holding the Retract Complete sensor to the Gripper base.
- Step 6** Disconnect the cable to the Retract Complete sensor.
- Step 7** Remove the Retract Complete Sensor.

### Replacing the Retract Complete Sensor

Perform the above procedure in reverse order.

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## Gripper Assembly Finger Open Sensor

The Gripper Assembly Finger Open Sensor Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-9 on page 7-11 for locations of components in the following procedure:

### Removing the Finger Open Sensor

#### **Note**

It is easier to replace the sensor if you remove the Gripper Assembly first (use Procedure on page 8-24) and place the Gripper Assembly on a flat surface to work on.

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Remove the 2 M3x10 screws on the Y-Axis Flex cable clamp.
- Step 3** Remove the Gripper Assembly Cover by removing the M3x10 screw located at the front of the cover.
- Step 4** Perform Procedure *Removing the Grip card (LGR1)* on page 8-32 and return here.
- Step 5** Remove the M3x10 screw holding the Finger Open sensor to the Gripper base.
- Step 6** Disconnect the cable to the Finger Open sensor.
- Step 7** Remove the Finger Open Sensor.

### Replacing the Finger Open Sensor

Perform the above procedure in reverse order.

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## Gripper Assembly Tach Sensor

The Gripper Assembly Tach Sensor Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-9 on page 7-11 for locations of components in the following procedure:

### Removing the Tach Sensor

#### **Note**

It is easier to replace the sensor if you remove the Gripper Assembly first (use Procedure on page 8-24) and place the Gripper Assembly on a flat surface to work on.

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Remove the 2 M3x10 screws on the Y-Axis Flex cable clamp.
- Step 3** Remove the Gripper Assembly Cover by removing the M3x10 screw located at the front of the cover.
- Step 4** Perform Procedure *Removing the Grip card (LGR1)* on page 8-32 and return here.
- Step 5** Remove the M3x10 screw holding the Tach sensor to the Gripper base.
- Step 6** Disconnect the cable to the Tach sensor.
- Step 7** Remove the Tach Sensor.

### Replacing the Tach Sensor

Perform the above procedure in reverse order.

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## Grip card (LGR1)

The LGR1 card Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8, Figure 7-9 on page 7-11 and Figure 7-21 on page 7-22 for locations of components in the following procedure:

## Removing the Grip card (LGR1)

### **Note**

It is easier to replace the card if you remove the Gripper Assembly first (use Procedure on page 8-24) and place the Gripper Assembly on a flat surface to work on.

### **Note**

**Do not** remove the Gripper Flex cable if you are sent here from a procedure to replace one of the Gripper Asm. sensors

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Remove the 2 M3x10 screws on the Y-Axis Flex cable clamp.
- Step 3** Remove the Gripper Assembly Cover by removing the M3x10 screw located at the front of the cover.
- Step 4** Remove the 2 M3x10 screws on the Y-Axis Flex cable retainer.
- Step 5** Disconnect 4 cables on the top side of the LGR1 card.
- Step 6** Remove the 4 M3x6 screws holding the LGR1 card to the base.
- Step 7** Cut the cable tie-wrap and carefully remove the Gripper Flex cable on the bottom side of the LGR1 card.
- Step 8** Remove the LGR1 card.

## Replacing the Grip card (LGR1)

Perform the above procedure in reverse order. **Be sure the Gripper Flex cable is securely attached to the LGR1 card, use a new tie-wrap to perform this procedure.**

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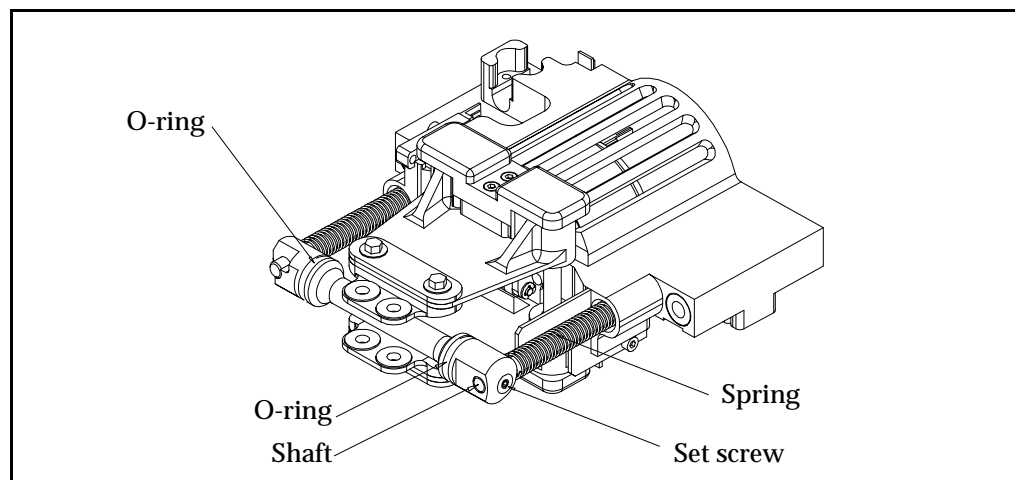
## Touch Tip Roller O-rings

The procedure for removing and replacing the O-rings is the same for all gripper types (half-inch or AIT). The O-ring Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 8-9 for locations of components in the following procedure:

### Removing the O-rings

- Step 1** Perform Procedure *Removing the Gripper Assembly* on page 8-24 and place the Gripper Assembly on a flat surface to work on.



**Figure 8-9** Touch Tip Roller O-rings

- Step 2** Remove the Set screw using a 1.5 mm hex wrench.
- Step 3** Hold the spring while separating the Touch Tip roller from the shaft.
- Step 4** Remove the O-rings from the Touch Tip roller.

### Replacing the O-ring

Perform the above procedure in reverse order.

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## X-Axis Drive Belt

The X-Axis Drive Belt Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-8 on page 7-10 for locations of components in the following procedure:

### Removing the X-Axis Drive Belt

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Loosen the 3 screws holding the X-Axis motor to the Control Module frame.
- Step 3** Slide the X-Axis Motor Assembly toward the front of the frame and remove the X-Axis Drive Belt from the motor sprocket and the drive shaft sprocket.

### Replacing the X-Axis Drive Belt

Perform the above procedure in reverse order.



It is easier to install the belt if you loop the belt over the Library drive shaft above the sprocket first then over the motor drive shaft sprocket.

**Note: The X-Axis Drive Belt will be properly tensioned if the X-Motor is pushed toward the back of the Library before the screws are tightened.**

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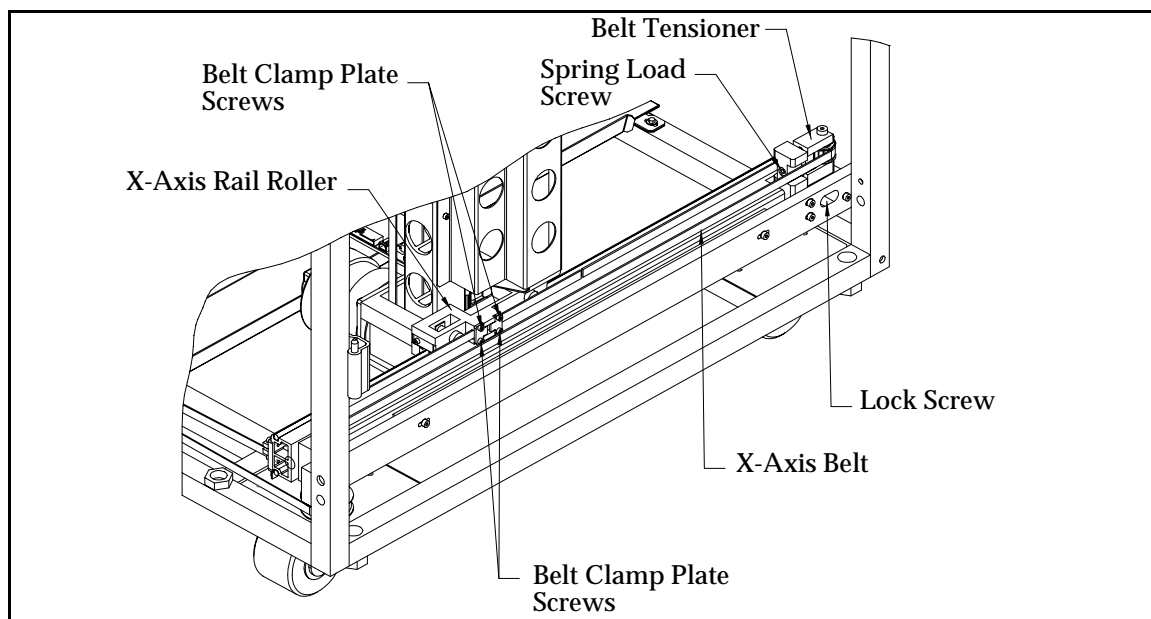
## X-Axis Belt (Top or Bottom)

The X-Axis Belt Part Number can be found on Table 8-1 on page 8-6.

See Figure 8-10 below. Use the following procedures to remove and replace the top or bottom X-Axis belt regardless of the number of frames in the library.

### Removing the X-Axis Belt

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Turn the Lock screw on the tensioner counter-clockwise with a 5mm Hex wrench until it's loose.
- Step 3** Load the tensioner spring by turning the Spring Load Screw clockwise with a 4 mm Hex wrench until the two parts of the tensioner assembly touch.
- Step 4** Remove the 4 screws holding two belt clamp plates using a 2.5 mm Hex wrench then remove the belt.



**Figure 8-10** X-Axis Belt Removal and Replacement

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## Replacing the X-Axis Belt

**Important:** Before attaching and tensioning the TOP belt, move the accessor to its home position (left side of the Control Module) and ensure that the accessor is straight by comparing the number of belt teeth between the shaft and the belt attachment plate. This is important to prevent the accessor from leaning to one side or another.

- Step 1** Perform the above procedure in reverse order. Ensure that each end of the belt has 3 teeth inside the belt clamp plate. When unloading the Tensioner by turning the Spring Load screw counterclockwise, ensure that this screw is completely loose before locking the Tensioner.
- Step 2** Perform Procedure *Checking the Accessor Alignment* on page 8-37.

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## Accessor Alignment

The Scalar 1000 Accessor can be out of alignment during shipment, after replacing an X-Axis belt or after installing the X-Axis belts when adding an Expansion Module. Use the following procedures to check and adjust the Accessor vertical alignment.

**The accessor can also appear to be out of alignment due to one of the following conditions, check them out before proceeding with the following procedure:**

- The X-Axis belts are not installed properly and caused the accessor to lean (refer to Procedure *Replacing the X-Axis Belt* on page 8-36).
- Barcode Scanner is out of alignment (See procedure on page 8-22) or a bad Barcode Scanner (the Scanner can be bad if the scan beam is out of specification. To determine this condition, run Teach New from the Op panel and observe the scan beam when it's swept horizontally across any fiducial labels; the left edge of the scan beam should stop right at the left edge of the barcode area, if this did not occur, the Scanner is bad).
- The fiducial labels are dirty, missing, damaged or not properly installed.
- Gripper Assembly is not firmly attached to the Y-Axis (See procedure on 8-39).

## Checking the Accessor Alignment

- Step 1** Move the Accessor toward its home position (left side of the Control Module).
- Step 2** Observe the belt areas between the left belt attachment plates and the pulleys. Ensure both the top and bottom X-Axis belts have the same number of teeth in this area.
- Step 3** If the number of belt teeth between the top belt and the bottom belt do not match, note the direction of the offset and perform Procedure *Adjusting the Accessor Alignment* on page 8-38. If the number of teeth offset are more than 2, the belt was not installed properly, refer to Procedure *Replacing the X-Axis Belt* on page 8-36.

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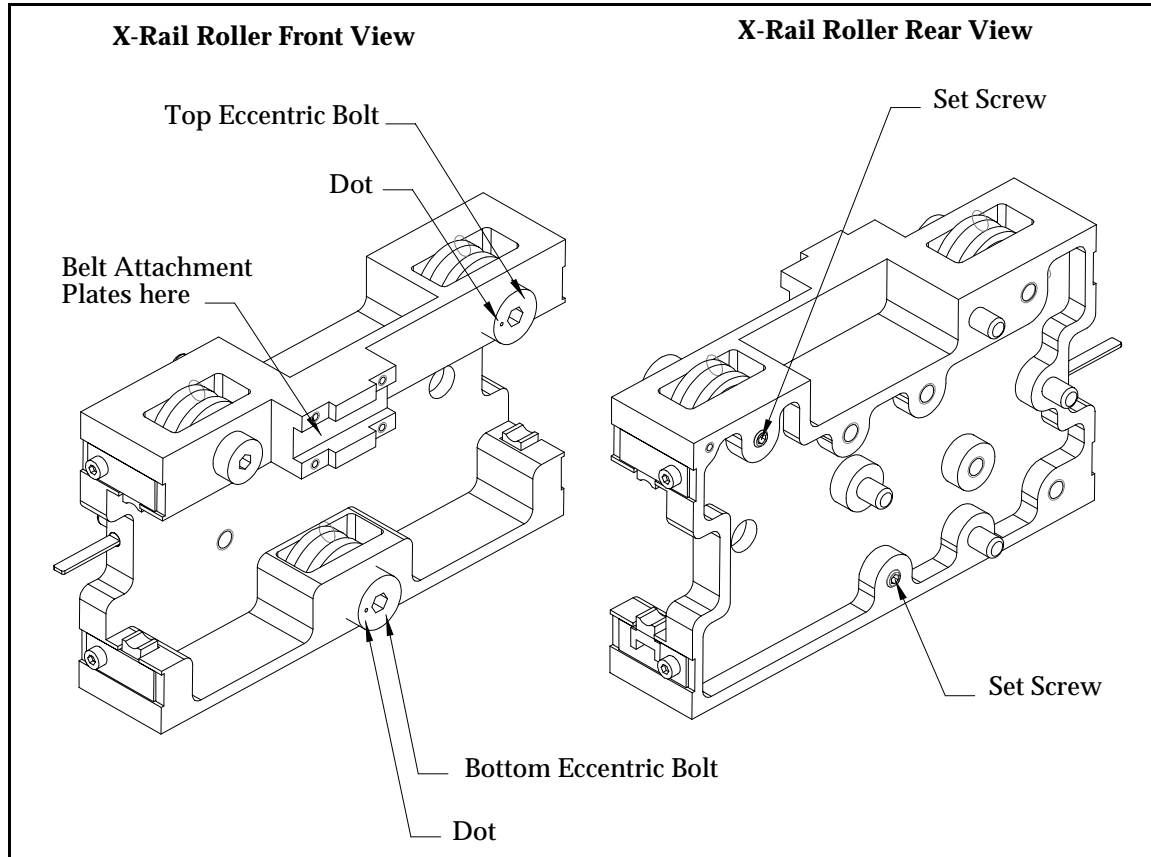
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## Adjusting the Accessor Alignment

Tools required: 2.5 mm, 4mm and 5 mm allen wrenches. Refer to Figure 8-11 on page 8-39.

- Step 1** Loosen the top tensioner Lock screw and load the belt tensioner spring by turning the Spring Load Screw clockwise with a 4mm allen wrench until the two parts of the tensioner assembly touch.
- Step 2** Loosen the set screws on both Eccentric Bolts by turning them counter clockwise half a turn using a 2.5 mm allen wrench.
- Step 3** Using a 5mm allen wrench, turn the bottom Eccentric bolt clockwise until the dot on the bolt points to 6 o'clock.
- Step 4** Using a 5 mm allen wrench, turn the top Eccentric bolt either clockwise or counter clockwise to vertically align the Accessor. Once aligned, lock the position by turning the set screw clockwise.
- Step 5** Using a 5 mm allen wrench, turn the bottom Eccentric bolt clockwise until the dot on the bolt points to 9 o'clock.
- Step 6** Lock the bottom Eccentric bolt by turning the set screw clockwise using a 2.5 mm allen wrench.
- Step 7** Retension the top tensioner and lock it in place.
- Step 8** Use the Operator Panel to reteach the Library (Main Menu >Service >Teach >Teach New).



**Figure 8-11** Accessor Vertical Alignment

## Checking and adjusting the Gripper attachment to the Y-axis

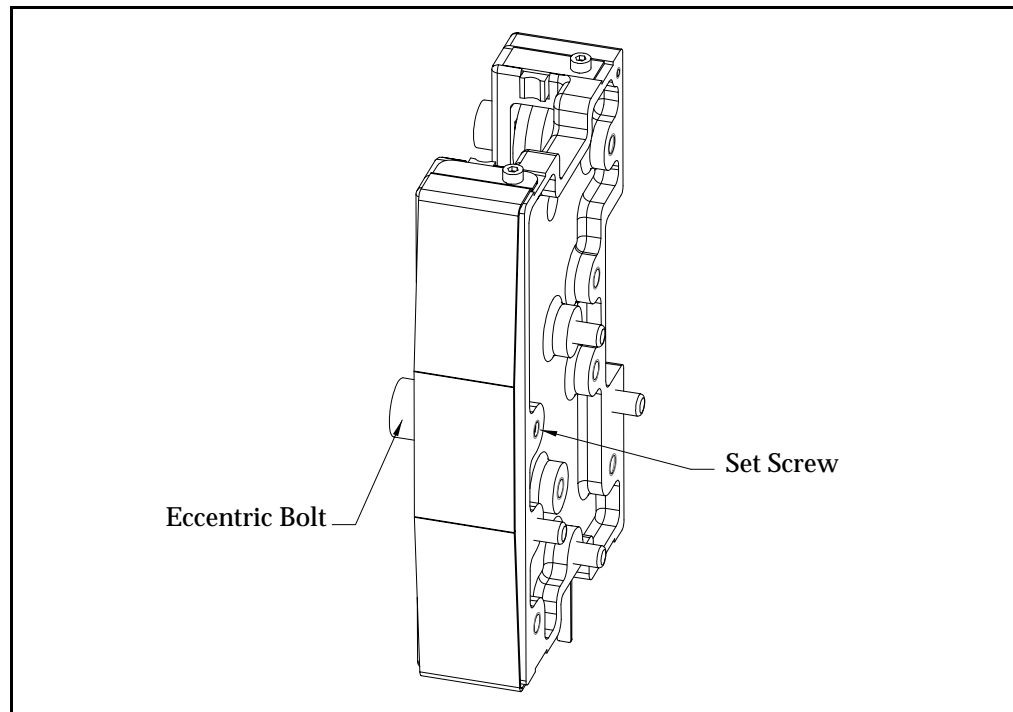
Refer to the Figure 8-12 on page 8-40.

### **Note**

It is easier to perform this step if you put the Scalar 1000 in the Y-axis Service position.

- Step 1** The Gripper Assembly is attached to the Y-axis via the Y-axis rail roller, check to see if the Gripper Assembly is firmly attached to the Y-axis.
- Step 2** If the Gripper is loose, loosen the Set screw by turning it counter clockwise with a 2.5 mm hex wrench then turning the Eccentric bolt with a 5mm hex wrench counter-clockwise until the Gripper assembly is firmly attached to the Y-axis, lock by turning the Set screw clockwise. **If you over tighten the Gripper to the Y-axis, it will not be able to move.**

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- 
- Step 3** Move the Gripper Assembly to the top of the Y-axis and let it drop, the Gripper Assembly should drop smoothly from top to bottom. Make any necessary adjustments as in Step 2 to ensure that this condition exists.
- Step 4** Use the Operator Panel to re-teach the Library (Main Menu >Service >Teach >Teach New).
- Step 5** Use the Operator Panel to re-inventory the Library (Main Menu >Commands >Inventory) and observe the gripper during its upward sweeps. If the gripper is slowing or stopping, the eccentric bolt was over-tightened. Repeat this Inventory process a few times to make sure that the gripper is properly attached to the Y-axis.



**Figure 8-12** Gripper attachment to Y-axis adjustment

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## X-Axis Moving Cable

The X-Axis Moving Cable Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-7 on page 7-9 for locations of components in the following procedure:

### Removing the X-Axis Moving Cable

- Step 1** Move the Accessor to the Control Module home position and note the X-Axis Moving cable loop and fold marks. The replacement cable must be installed in the same position.
- Step 2** Disconnect the two X-Axis **fixed** cables from the X-Axis moving cable connector card (this is the end of the X-Axis moving cable that's attached to the frame).
- Step 3** Remove the X-Axis moving cable strain relief on the frame. This strain relief is located on the Control Module for a 1 or 2 frame Library and it is located on the first Expansion Module for a 3 or 4 frame library.
- Step 4** Remove the 4 screws holding the X-Axis moving cable connector card to the frame.
- Step 5** Put the accessor in Y service position and remove the X-Axis cable strain relief on the LYP1 card.
- Step 6** Remove the X-Axis Flex cable.

### Replacing the X-Axis Moving Cable

Perform the above procedure in reverse order. **The replacement X-Axis moving cable is not folded when it's shipped from the factory, carefully fold the replacement cable using the old cable as a model.**

**Important:** If you are here to replace the cable for a 3 or 4 frame Library, use Procedure *Library X-Axis Moving cable on page 11-20* for additional tips on how to install the new cable properly.

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## X-Axis Home Sensor

The X-Axis Home Sensor Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-8 on page 7-10 for locations of components in the following procedure:

### Removing the X-Axis Home Sensor

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Disconnect the cable to the sensor.
- Step 3** Removing the two screws holding the sensor using a 2.5 mm hex wrench.
- Step 4** Remove the sensor.

### Replacing the X-Axis Home Sensor

Perform the above procedure in reverse order.

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## X-Axis Motor

The X-Axis Motor Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-8 on page 7-10 for locations of components in the following procedure:

### Removing the X-Axis Motor

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Disconnect all cables to the motor.
- Step 3** Remove the 3 screws that attach the motor assembly to the Control Module frame.
- Step 4** Remove the motor from the X-Axis Drive Belt.

### Replacing the X-Axis Motor

Perform the above procedure in reverse order.

**Note:** The X-Axis Drive Belt will be properly tensioned if the X-Motor is pushed toward the back of the Library before the screws are tightened.

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## X-Axis Rail Roller

The X-Axis Rail Roller Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8, Figure 7-7 on page 7-9 and Figure 7-8 on page 7-10 for locations of components in the following procedure.

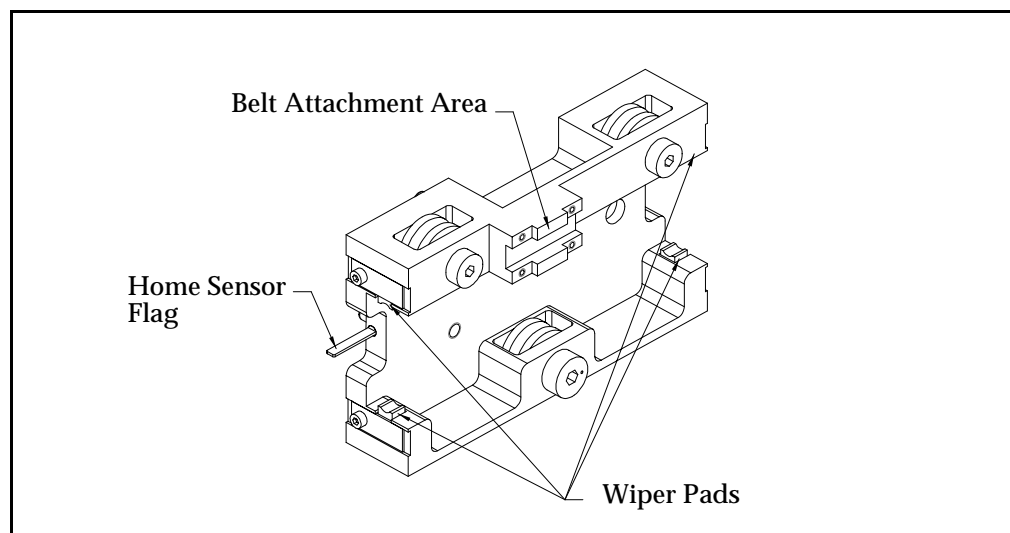
### Removing the X-Axis Rail Roller

- Step 1** Perform Procedure *Removing the Accessor Assembly* on page 8-47.
- Step 2** Remove the screws that fasten the X-Axis Rail Roller to the Y-Axis Assembly and remove the X-Axis rail roller

### Replacing the X-Axis Rail Roller

Perform the above procedure in reverse order. After replacing the X-Axis Rail Roller, lubricate the 4 wiper pads by putting a few drops of Lubricant #6 (P/N 106403) on each wiper pad.

Use the Operator Panel to reteach the Library (Main Menu >Service >Teach >Teach New).



**Figure 8-13** X-Axis Rail Roller

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## X-Rail Assembly (Top or Bottom)

The X-Rail Assembly Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-7 on page 7-9 for locations of components in this procedure.

### Removing the X-Rail Assembly

- Step 1** Perform Procedure *Removing the Accessor Assembly* on page 8-47.
- Step 2** Both Top and Bottom X-Rail Assemblies are attached to the frame by 2 screws. Remove these 2 screws holding the Rail Assembly to the frame. For a multiple frame Library, start with the last frame first.
- Step 3** For the Bottom X-Rail Assembly, remove the 2 screws holding together the X-Rail assemblies between frames.
- Step 4** Remove the 2 screws holding the X-Rail Assembly between frames.
- Step 5** Remove the Rail Assembly.

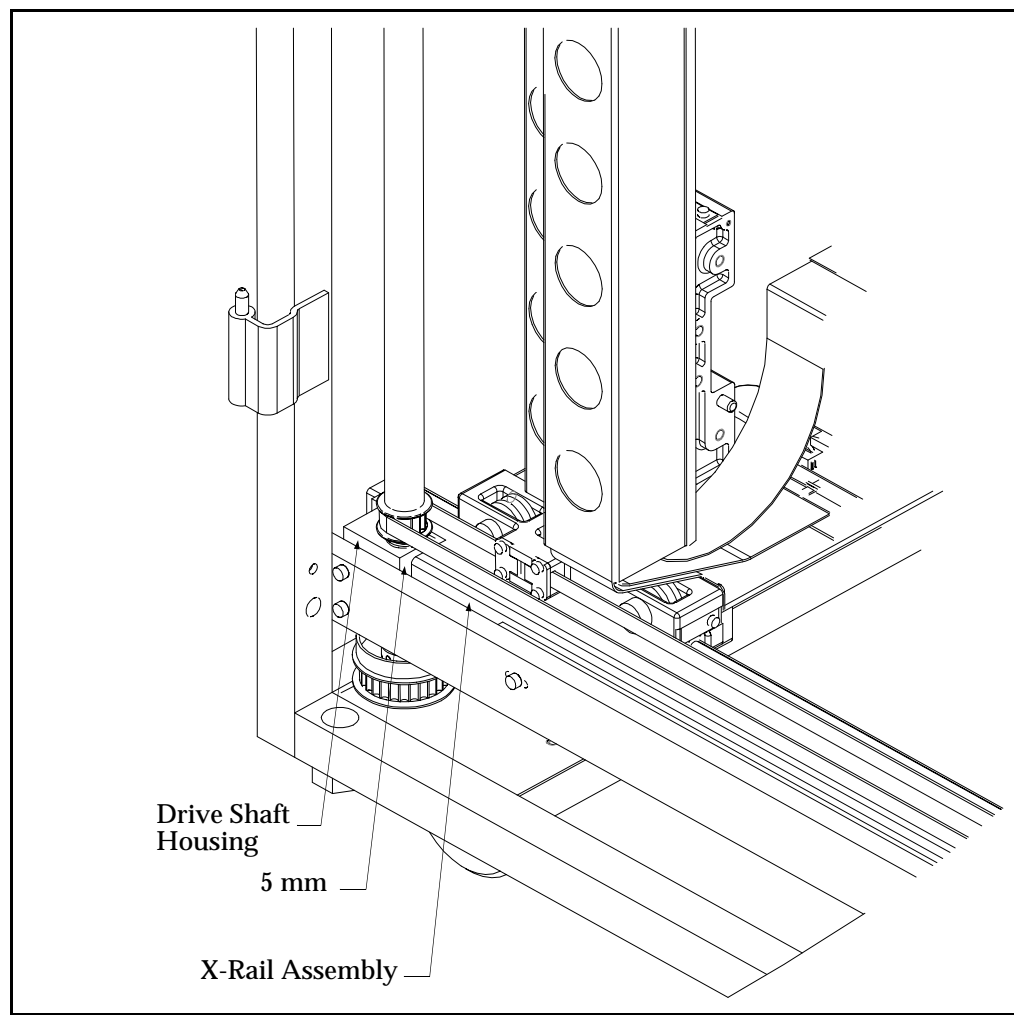
### Replacing the X-Rail Assembly

**Important Note:** If you are here to replace the bottom X-rail Assembly in the Control Module, make sure this rail assembly is centered in the frame by leaving a 5mm gap between the X-rail assembly and the Drive shaft housing as shown in Figure 8-14 on page 8-46. An easy way to achieve this is to insert a 5 mm allen wrench between these two assemblies before attaching the bottom X-rail assembly to the frame.

**The Scalar 1000 firmware will be unable to teach if the bottom X-Rail Assembly is not centered in the frame.**

Perform the above procedure in reverse order.

Perform procedure “Check the Barcode Scanner Beam” and “Reattach the Library” as described in *Replacing the Gripper Assembly* on page 8-25.



**Figure 8-14** Control Module X-Rail Assembly centering

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## Accessor Assembly

The Accessor Assembly Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-7 on page 7-9 for locations of components in the following procedure.

### Removing the Accessor Assembly

- Step 1** Remove the right front cover of the last frame in the Library Subsystem by removing 6 screws.
- Step 2** Remove both top and bottom X-Axis belts by performing Procedure *Removing the X-Axis Belt* on page 8-35.
- Step 3** Disconnect the X-Axis Moving cable from the LYP1 card.
- Step 4** Perform Procedure *Removing the Gripper Assembly* on page 8-24.
- Step 5** Remove the crash stop and the End cap in the last frame.
- Step 6** Remove the top and bottom belt tensioners.
- Step 7** Slide the Accessor Assembly out of the Library.

### Replacing the Accessor Assembly

Perform the above procedure in reverse order.

**Important:** You may have to loosen the bottom eccentric bolt on the X-rail roller of the new accessor in order to slide it into the X-rail. Retighten the bolt and move the accessor along the X-rail to ensure there is no bind before proceeding with the other steps.

After replacing the Accessor, lubricate the 4 wiper pads on the X-Axis rail roller by putting a few drops of Lubricant #6 (P/N 106403) on each wiper pad.

Perform procedure “Check the Barcode Scanner Beam” and “Reteach the Library” as described in *Replacing the Gripper Assembly* on page 8-25.

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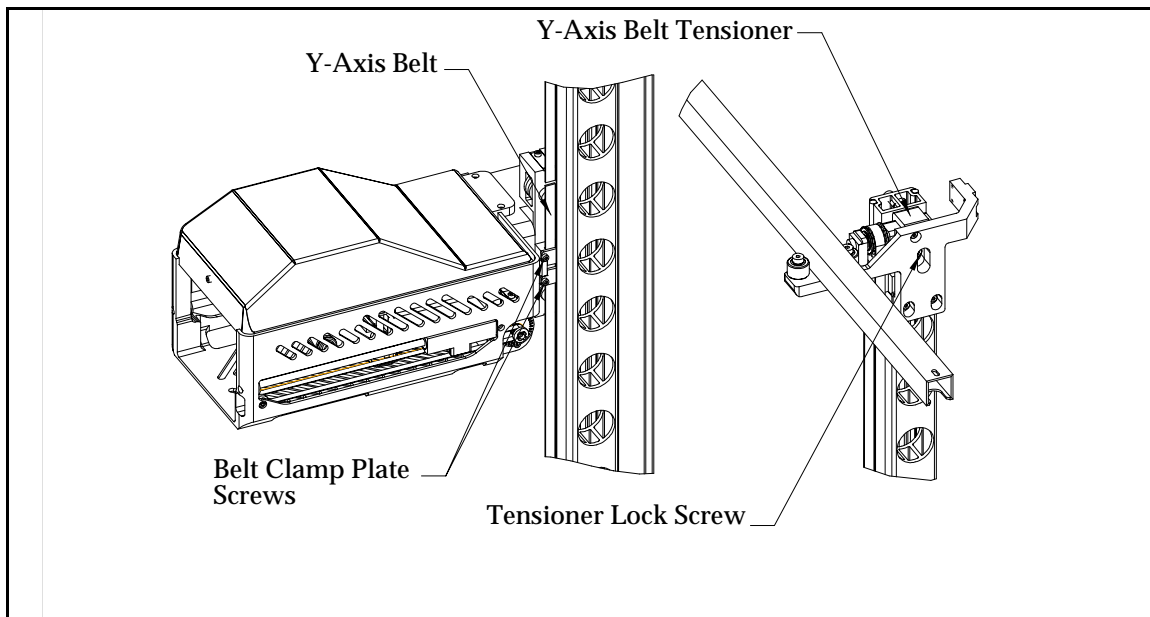
## Y-Axis Belt

The Y-Axis Belt Part Number can be found on Table 8-1 on page 8-6.

See Figure 8-15 on page 8-48 for the following procedure.

### Removing the Y-Axis Belt

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Turn the Lock screw on the tensioner counter-clockwise with a 5mm Hex wrench until it's loose.
- Step 3** Unload the tensioner spring by turning the screw clockwise with a 4 mm Hex wrench until the two parts are closed.
- Step 4** Remove the 2 screws holding each belt clamp plate using a 2.5 mm Hex wrench and remove the belt.



**Figure 8-15** Y-Axis Belt Removal and Replacement

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## Replacing the Y-Axis Belt

Perform the above procedure in reverse order. Ensure that each end of the belt has 3 teeth inside the belt clamp plate. When unloading the Tensioner by turning the Spring Load screw counterclockwise, ensure that this screw is completely loose before locking the Tensioner.

Perform procedure “Check the Barcode Scanner Beam” and “Reattach the Library” as described in *Replacing the Gripper Assembly* on page 8-25.

## Y-Axis Home Sensor

The Y-Axis Home Sensor Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-7 on page 7-9 and Figure 7-8 on page 7-10 for locations of components in the following procedure:

## Removing the Y-Axis Home Sensor

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Disconnect the cable to the sensor.
- Step 3** Remove the two screws holding the sensor using a 2.5 mm hex wrench.
- Step 4** Remove the sensor.

## Replacing the Y-Axis Home Sensor

Perform the above procedure in reverse order.

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## Y-Axis Cable

The Y-Axis Cable Part Number can be found on Table 8-1 on page 8-6.

### Removing the Y-Axis Cable

- Step 1**    Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2**    Remove the 2 M3x10 screws on the Y-Axis Flex cable clamp.
- Step 3**    Remove the Gripper Assembly Cover by removing the M3x10 screw located at the front of the cover.
- Step 4**    Disconnect the Y-Axis cable from the LGR1 card and the LYP1 cards.
- Step 5**    Remove the Y-Axis cable.\

### Replacing the Y-Axis Cable

**Note the position of the cable in the cable trough and use the old cable as a guide to fold the new cable then perform the above procedure in reverse order.**

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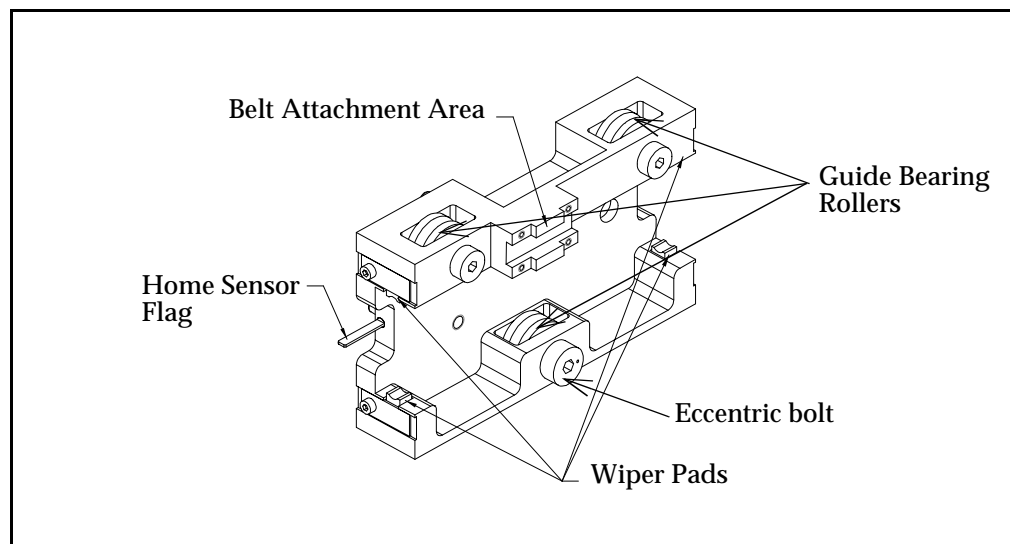
## Y-Axis Rail Roller

The Y-Axis Rail Roller Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8 and Figure 7-7 on page 7-9 for locations of components in the following procedure.

### Removing the Y-Axis Rail Roller

- Step 1** Perform Procedure *Removing the Gripper Assembly* on page 8-24.
- Step 2** Perform Procedure *Removing the Y-Axis Belt* on page 8-48.
- Step 3** Remove the two guide bearing rollers by removing the bolts holding them in place.
- Step 4** Turn the eccentric bolt so that the remaining guide bearing roller moves away from the Y-Axis bearing rod.
- Step 5** Remove the Y-Axis Rail Roller by twisting it out of the Y-axis assembly.



**Figure 8-16** Y-Axis Rail Roller

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## Replacing the Y-Axis Rail Roller

Perform the above procedure in reverse order.

After replacing the Y-Axis Rail Roller, lubricate the 4 wiper pads by putting a few drops of Lubricant #6 (P/N 106403) on each wiper pad.

**Important: Retighten the eccentric bolt and move the Gripper Assembly along the Y-rail to ensure there is no bind before proceeding with the other steps. You may refer to Procedure *Checking and adjusting the Gripper attachment to the Y-axis* on page 8-39 for more information.**

Perform procedure “Check the Barcode Scanner Beam” and “Reattach the Library” as described in *Replacing the Gripper Assembly* on page 8-25.

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## Y-Axis Motor

The Y-Axis Motor Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-7 on page 7-9 and Figure 7-8 on page 7-10 for locations of components in the following procedure:

### Removing the Y-Axis Motor

- Step 1** Perform Procedure *Cartridge Accessor Service Position* on page 8-15 and return here.
- Step 2** Disconnect the cables from the Y-Axis Motor to the LYP1 card.
- Step 3** Perform Procedure *Removing Y-Axis Belt* on page 8-48 and return here.
- Step 4** Remove the 4 screws holding the motor to the bracket.
- Step 5** Remove the motor.

### Replacing the Y-Axis Motor

Perform the above procedure in reverse order.

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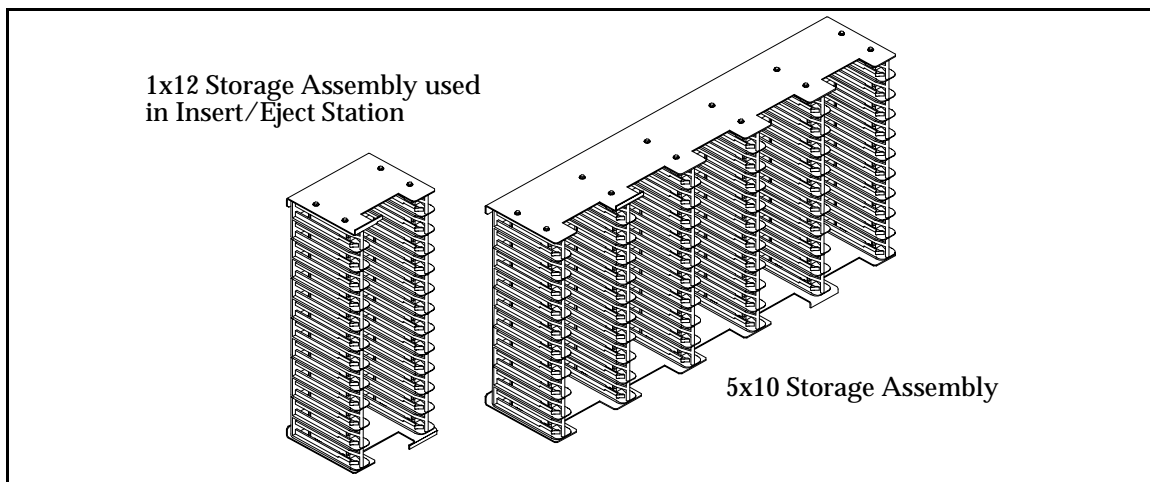
## Storage Assemblies (1x10, 1x12, 4x12, 5x10, 5x12, 1x15, 1x18, 4x18, etc.)

The Storage Assemblies Part Number can be found on Table 8-1 on page 8-6.

The procedure for removing and replacing any of the storage assemblies for half-inch, DLT or AIT type cartridges is the same. Refer to Figure 7-2 on page 7-4 and Figure 8-17 for locations of components in the following procedure:

### Removing the Storage Assembly

- Step 1** Perform Procedure *Prepare for Service* on page 5-4 and then return here.
- Step 2** Move the accessor to a position in the Library to allow access to the storage assembly.
- Step 3** Remove tape cartridges from the broken storage assembly.
- Step 4** Remove the 4 screws (M4x8) holding the storage assembly to the frame then remove the storage assembly.



**Figure 8-17** Examples of Storage Assemblies



## Replacing the Storage Assembly

Be sure to order the correct Storage Assembly for your Library. Refer to Table 8-1 on page 8-6 for the correct Part Number.

Perform the above procedure in reverse order. **Be sure to re-teach and re-inventory the Library using the Operator Panel if these options are not set automatically (Main Menu >Service >Teach >Teach New).**

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## Control Module Electronics

### LSC (SCSI and Control) Car

The LSC1 and LSC2 Card Part Number can be found on Table 8-1 on page 8-6.

**Prior to proceeding with the following procedure, if possible, try to retrieve all Scalar 1000 Subsystem configuration data such as SCSI ID, Number of Ports, etc. using the Setup option on the panel.**

Depending on the Scalar 1000 models you are working on, refer to the following figures for locations of components:

- **Model C10:** Figure 7-4 on page 7-6, Figure 7-13 on page 7-15 and Figure 7-16 on page 7-18.
- **Model C20 & C30:** Figure 7-5 on page 7-7, Figure 7-15 on page 7-17 and Figure 7-16 on page 7-18.

**Note: Recent C20 and C30 models have an electronics cover that must be removed to access the LSC card. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.**



### Removing the LSC Card

- Step 1** Power Off the Library Control Module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.
- Step 2** Disconnect all cables and LAM1 card from the LSC card.
- Step 3** Remove the screws that fasten the LSC card to the wall.
- Step 4** Disconnect the LSC card from the LMC card.

### Replacing the LSC Card

Perform the removal steps in reverse order. Check the Microcode level on the replacement card (Main Menu >About). Update the Microcode level if needed using the Microcode diskette shipped with the Library, refer to Procedure *Updating Microcode* on page 8-74. **Re-enter the ALM/S Subsystem configuration data if known.**

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## LMC (Machine Control) Card

The LMC Card Part Number can be found on Table 8-1 on page 8-6.

Depending on the Scalar 1000 models you are working on, refer to the following figures for locations of components:

- **Model C10:** Figure 7-4 on page 7-6, Figure 7-13 on page 7-15 and Figure 7-18 on page 7-20.
- **Model C20 & C30:** Figure 7-5 on page 7-7, Figure 7-15 on page 7-17 and Figure 7-18 on page 7-20.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to access the LMC card. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.



### Removing the LMC card

Before replacing the LMC card, check that both fuses (F1, F2) are not blown. If a fuse is blown, replace the fuse and power up the Library.

- Step 1** Power Off the Library Control Module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.
- Step 2** Disconnect all cables from the LMC card.
- Step 3** Remove the screws that fasten the LMC card to the wall.
- Step 4** Disconnect the LMC card from the LSC card.

### Replacing the LMC Card

Perform the removal steps in reverse order.

## LDF1, LVD1 or LSE1 (SCSI Adapter) Card

The LDF1, LVD1 and the LSE1 Card Part Numbers can be found on Table 8-1 on page 8-6.

Depending on the Scalar 1000 models you are working on, refer to the following figures for locations of components:

- 
- 
- **Model C10:** Figure 7-4 on page 7-6, Figure 7-13 on page 7-15 and Figure 7-25 on page 7-24.
  - **Model C20 & C30:** Figure 7-5 on page 7-7, Figure 7-15 on page 7-17 and Figure 7-25 on page 7-24.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to get access to the LDF/LVD/LSE cards. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.



## Removing the LDF1, LVD1 or LSE1 Card

- Step 1** Power Off the Library Control Module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.
- Step 2** Disconnect all SCSI cables and/or SCSI terminator from the LDF1, LVD1 or LSE1 card.
- Step 3** Disconnect the LDF1, LVD1 or LSE1 card from the LSC card.

## Replacing the LDF1,LVD1 or LSE1 Card

Perform the removal steps in reverse order. Ensure the SCSI Term power jumper on the replacement card is set the same way as the failed card.

## LPN1 (Operator Panel) Car

The LPN1 Card Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-5 on page 7-7, Figure 7-19 on page 7-21 and Figure 7-33 on page 7-28 for locations of components in the following procedure.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to access the LPN card. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.



## Removing the LPN1 Card

- Step 1** Power Off the Library Control Module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.

- 
- 
- Step 2** Disconnect cables at **J2** and **J3** connectors on the LPN1 card.
  - Step 3** Remove the 4 M4x8 screws that fasten the Operator Panel Assembly to the Control Module frame.
  - Step 4** Remove the Operator Panel Assembly.
  - Step 5** Disconnect the cable at **J1** connector on the LPN1 card.
  - Step 6** Remove the LPN1 card by popping it out of the 4 plastic stand-offs.

## Replacing the LPN1 Card

Perform the removal steps in reverse order

## Message Display Car

The Message Display Card Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-5 on page 7-7, Figure 7-33 on page 7-28 or Figure 7-34 on page 7-29 for locations of components in the following procedure.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to access the Message Display card. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.



## Removing the Message Display Card

- Step 1** Power Off the Library Control Module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.
- Step 2** Disconnect cables at **J2** and **J3** connectors on the LPN1 card.
- Step 3** Remove the 4 M4x8 screws that fasten the Operator Panel Assembly to the Control Module frame.
- Step 4** Remove the Operator Panel Assembly.
- Step 5** Disconnect the cable at **J1** connector on the LPN1 card.

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**Step 6** Disconnect the ground wire between the Display card and the Operator Panel Assembly.

**Step 7** Remove the Display card from the LPN1 card by popping it out of the 4 plastic stand-offs.

## Replacing the Message Display Card

Perform the removal steps in reverse order.

## LBI (Library Interface) Car

The LBI1 and LBI2 Card Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-5 on page 7-7 and Figure 7-23 on page 7-23 for locations of components in the following procedure:



## Removing the LBI Car

**Step 1** Perform Procedure *Prepare for Service* on page 5-4 and then return here.

**Step 2** Disconnect all cables and/or LBI Terminator card from the LBI card.

**Step 3** Remove the 4 screws holding the LBI card.

**Step 4** Remove the LBI card.

## Replacing the LBI Card

Perform the removal steps in reverse order.

## LYP1 (Connector) Card

The LYP1 Card Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-6 on page 7-8, Figure 7-7 on page 7-9 and Figure 7-20 on page 7-21 for locations of components in the following procedure:



## Removing the LYP1 Card

**Step 1** Perform Procedure *Prepare for Service* on page 5-4 and then return here.

- 
- 
- Step 2** Perform Procedure *Removing the Y-Axis Home Sensor* on page 8-49 and return here.
  - Step 3** Remove the 2 screws holding the X-Axis cable strain relief.
  - Step 4** Disconnect all cables to the LYP1 card.
  - Step 5** Remove the 2 screws holding the LYP1 card to the mounting plate.

### Replacing the LYP1 Card

Perform the above procedure in reverse order.

## LAM1 (Accessor Motion) Card

The LAM1 Card Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-5 on page 7-7, Figure 7-15 on page 7-17 and Figure 7-26 on page 7-24 for locations of components in the following procedure.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to access the LAM card. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.



### Removing the LAM1 Card

- Step 1** Power Off the Library Control Module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.
- Step 2** Disconnect the LAM1 card from the LSC1 card.

### Replacing the LAM1 Card

Perform the above steps in reverse order.

## Power Amplifiers

The Power Amplifier Part Number can be found on Table 8-1 on page 8-6. Depending on the Scalar 1000 models you are working on, refer to the following figures for locations of components:

- 
- 
- **Model C10:** Figure 7-4 on page 7-6, Figure 7-13 on page 7-15 and Figure 7-28 on page 7-25.
  - **Model C20 & C30:** Figure 7-5 on page 7-7, Figure 7-15 on page 7-17 and Figure 7-28 on page 7-25.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to get access to the Power Amplifiers. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.



## Removing the X-Axis or Y-Axis Power Amplifiers

**Tool needed:** 2.5 mm Hex wrench

Before replacing the X-Axis or Y-Axis Power Amplifier, check that its associated fuse (4A) is not blown (refer to Figure 7-13 on page 7-15 or Figure 7-15 on page 7-17 for locations of these fuses). If a fuse is blown, replace the fuse and power up the Library.

- Step 1** Power Off the Control module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.
- Step 2** Disconnect the Logic Cable connector.
- Step 3** Remove the 5 wires from the Power connector by loosening the screws.
- Step 4** Remove the screws holding the Power Amplifier to the Control Module and then remove the Power Amplifier.

## Replacing the X-Axis or Y-Axis Power Amplifiers

- Step 1** Perform the removal steps in reverse order.
- Step 2** Ensure that the switch settings on the Power Amplifier are set correctly.

## Insert/Eject Station

The Insert/Eject Station Part Number can be found on Table 8-1 on page 8-6.

Refer to Figure 7-11 on page 7-13.

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## Removing the I/E Station

- Step 1** Perform *Prepare for Service* on page 5-4 and then return here.
- Step 2** Slide the I/E Station out and remove 4 screws holding the I/E Station 1x12 storage assembly.
- Step 3** Remove 4 screws holding the I/E Station bezel.
- Step 4** Push the I/E Station to its closed position and remove the 4x12 (or 4x18 for AIT) storage array to the right of the I/E station. Refer to Procedure *Removing the Storage Assembly* on page 8-54.
- Step 5** Disconnect the I/E Station Closed Sensor cable.
- Step 6** Remove 4 screws holding the I/E Station.
- Step 7** Remove the I/E Station.

## Replacing the I/E Station

Perform the above procedure in reverse order.

Use the Operator Panel to reattach the Library (Main Menu >Service >Teach >Teach New).

## I/E Station Locked Assembly

The Insert/Eject Station Locked Assembly Part Number can be found on Table 8-1 on page 8-6. This assembly contains the Insert/Eject Station Locked Sensor and the Insert/Eject Station Locked Solenoid.

**Note: Recent C20 and C30 models have an electronics cover that must be removed to get access to the I/E Station Locked Assembly. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.**

See Figure 8-18 on page 8-64.

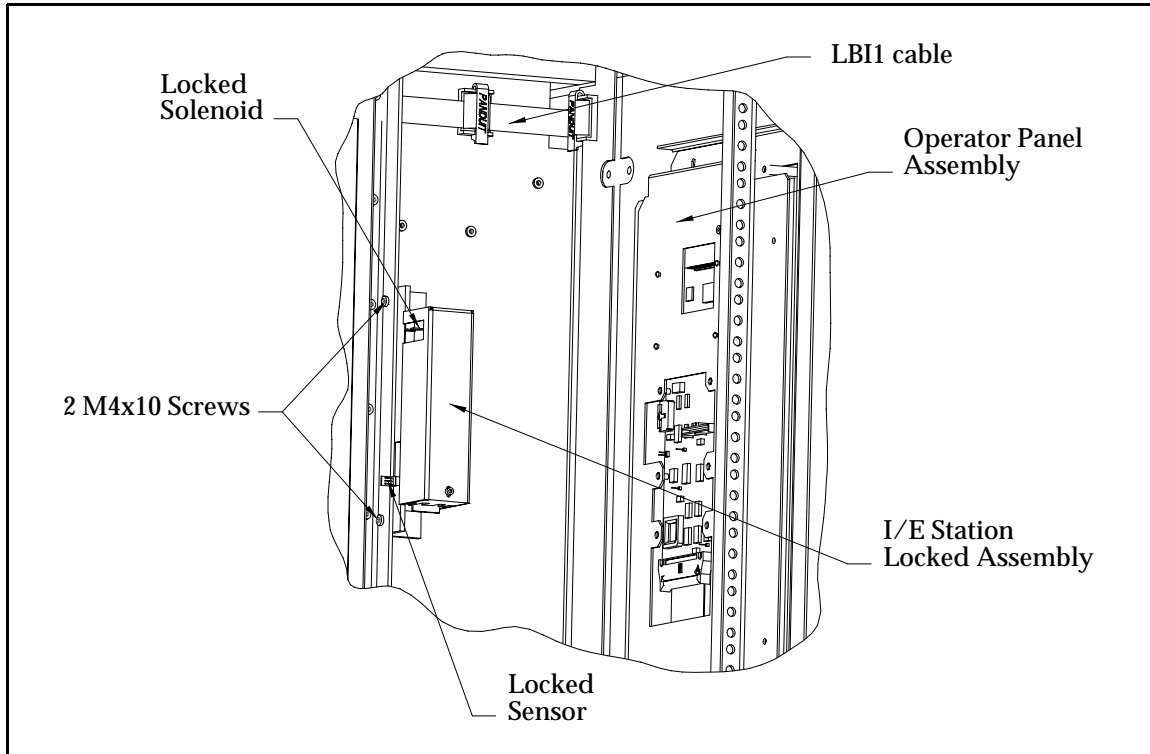
## Removing the I/E Station Lock Assembly

- Step 1** Perform Procedure *Prepare for Service* on page 5-4 and then return here.

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**Step 2** Remove the cables to the I/E Station Locked Sensor and the Locked Solenoid.



**Figure 8-18** I/E Station Locked Assembly Removal and Replacement

**Step 3** Using a 3mm allen wrench, remove the 2 M4x10 screws holding the I/E Station Locked Assembly to the Control Module frame.

**Step 4** Remove the I/E Station Locked Assembly.

### Replacing the I/E Station Locked Assembly

Perform the above procedure in reverse order.

### I/E Station Closed Sensor

The Insert/Eject Station Closed Sensor Part Number can be found on Table 8-1 on page 8-6.

See Figure 7-11 on page 7-13 for location of the I/E Station Closed Sensor.

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## Removing the I/E Station Closed Sensor

- Step 1** Perform Procedure *Prepare for Service* on page 5-4 and then return here.
- Step 2** Slide the I/E Station out and remove 4 screws holding the I/E Station 1x12 storage assembly.
- Step 3** Remove 4 screws holding the I/E Station bezel.
- Step 4** Disconnect the I/E Station Closed Sensor cable.
- Step 5** Remove 4 screws holding the I/E Station.
- Step 6** Remove the M3x10 screw holding the I/E Station Closed sensor to the I/E Station.
- Step 7** Disconnect the cable to the I/E Station Closed sensor.
- Step 8** Remove the I/E Station Closed Sensor.



## Replacing the I/E Station Closed Sensor

Perform the above procedure in reverse order.

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## Power

### AC Power Compartment

The AC Power Compartment Part Number can be found on Table 8-1 on page 8-6. **There are two AC Power Compartment styles, make sure you order the correct one for you system, the one with 12 AC outlets can be substituted for the one with only 4 outlets.**

Depending on the Scalar 1000 models you are working on, refer to the following figures for locations of components:

- **Model C10:** Figure 7-4 on page 7-6, Figure 7-13 on page 7-15 and Figure 7-31 on page 7-27.
- **Model C20 and C30:** Figure 7-5 on page 7-7, Figure 7-15 on page 7-17 and Figure 7-31 on page 7-27.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to get access to the AC Power Compartment. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover and the AC Switch cover.

### Removing the AC Power Compartment

- Step 1** Set the circuit breaker on the AC Power Compartment to the Off position.
- Step 2** Disconnect the mainline AC power cable from the frame that contains the AC Power Compartment to be removed.
- Step 3** Disconnect all other cables from the AC Power Compartment.
- Step 4** Remove the green and yellow ground wire from the frame. Save the screw and lock washer.
- Step 5** Remove the two screws that fasten the AC Power Compartment to the frame.
- Step 6** Remove the AC Power Compartment.

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## Replacing the AC Power Compartment

Perform the above procedure in reverse order.

## +24V DC Power Supply

The +24V DC Power Supply Part Number can be found on Table 8-1 on page 8-6.

**Note: The procedure for removing and replacing the +24V DC Power Supply is the same regardless of whether the Library is equipped with a Single or Dual Power Supply systems.**

Depending on the Scalar 1000 models you are working on, refer to the following figures for locations of components:

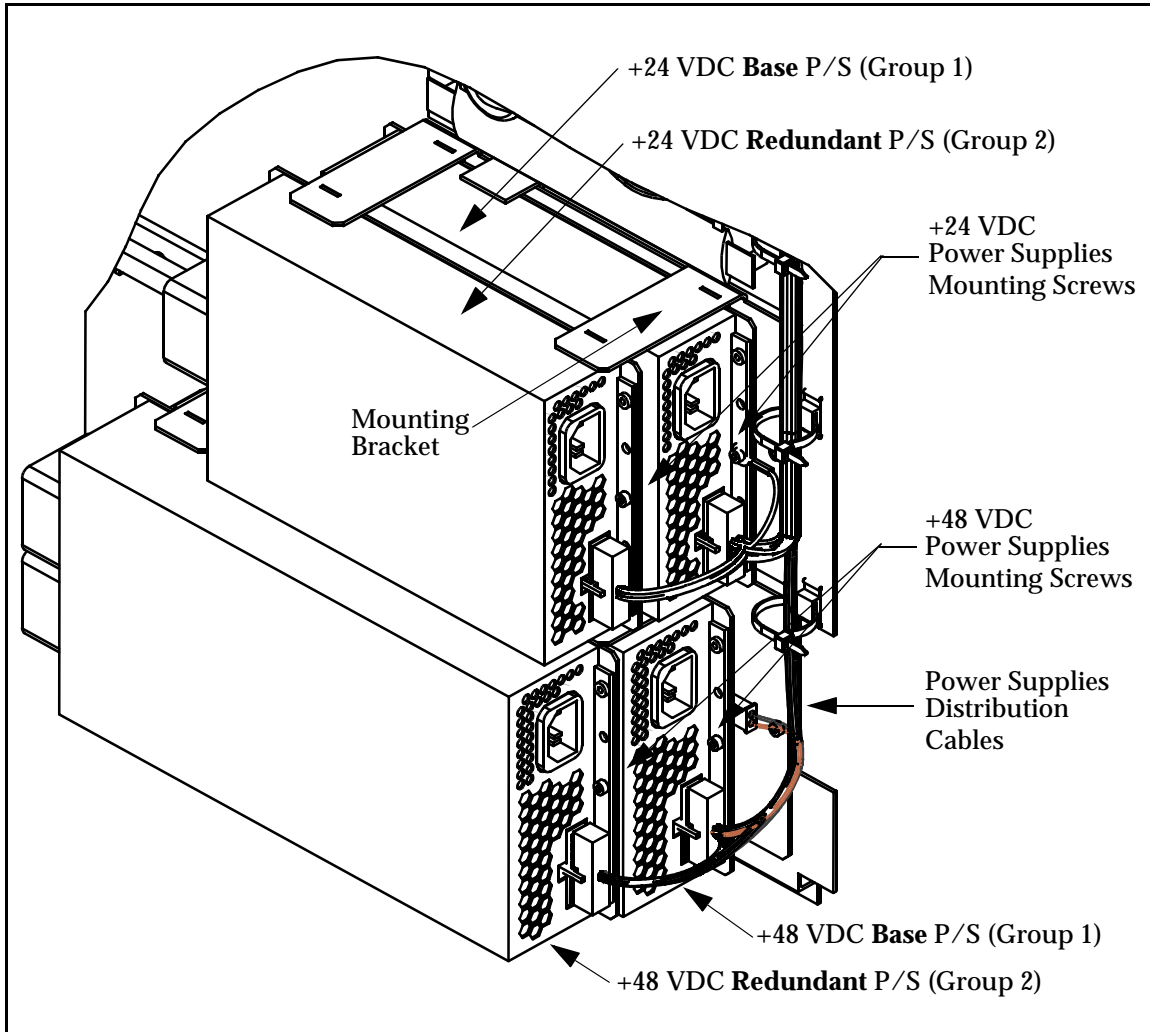
- **Model C10:** Figure 7-4 on page 7-6, Figure 7-13 on page 7-15 and Figure 7-30 on page 7-26.
- **Model C20 and C30:** Figure 7-5 on page 7-7, Figure 7-15 on page 7-17 and Figure 7-30 on page 7-26.

**Note: Recent C20 and C30 models have an electronics cover that must be removed to get access to the +24V DC Power Supply. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.**

## Removing the +24V DC Power Supply

- Step 1** Power Off the Control Module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.
- Step 2** Disconnect the AC Input cable and the DC Output cable from the power supply.
- Step 3** Remove the screw that fastens the power supply to the wall or bracket then remove the power supply.

Refer to Figure 8-19 on page 8-68 for locations of the screws in a Dual Power Supply system.



**Figure 8-19** Dual Power Supply System Removal and Replacement

### ■ Replacing the +24V DC Power Supply

Perform the removal steps in reverse order.

### ■ +48V DC Power Supply

The +48V DC Power Supply Part Number can be found on Table 8-1 on page 8-6.

**Note:** The procedure for removing and replacing the +48V DC Power Supply is the same regardless of whether the Library is equipped with a Single or Dual Power Supply systems.

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Depending on the Scalar 1000 models you are working on, refer to the following figures for locations of components:

- **Model C10:** Figure 7-4 on page 7-6, Figure 7-13 on page 7-15 and Figure 7-29 on page 7-26.
- **Model C20 and C30:** Figure 7-5 on page 7-7, Figure 7-15 on page 7-17 and Figure 7-29 on page 7-26.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to get access to the +48V DC Power Supply. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.

## Removing the +48V DC Power Supply

- Step 1** Power Off the Control Module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.
- Step 2** Disconnect the AC Input cable and the DC Output cable from the power supply.
- Step 3** Remove the screw that fastens the power supply to the wall or the bracket then remove the power supply.

Refer to Figure 8-19 on page 8-68 for locations of the screws in a Dual Power Supply system.

## Replacing the +48V DC Power Supply

Perform the above procedure in reverse order.

## Shunt Regulator

The Shunt Regulator Part Number can be found on Table 8-1 on page 8-6.

Depending on the Scalar 1000 models you are working on, refer to the following figures for locations of components:

- **Model C10:** Figure 7-4 on page 7-6, Figure 7-13 on page 7-15 and Figure 7-27 on page 7-25.
- **Model C20 and C30:** Figure 7-5 on page 7-7, Figure 7-15 on page 7-17 and Figure 7-27 on page 7-25.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to get access to the Shunt Regulator. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.

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## Removing the Shunt Regulator

- Step 1** Power Off the Control Module by setting the Power Supplies Switch on the AC Power Compartment to the Off position.
- Step 2** Disconnect the two wires from the Shunt Regulator to the X-Axis Power Amplifier and disconnect all cables to the Shunt Regulator.
- Step 3** Remove the 4 screws that fasten the Shunt Regulator to the wall then remove the Shunt Regulator.



## Replacing the Shunt Regulator

Perform the above procedure in reverse order.

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## Preventive Maintenance

Perform the following procedure when you are sent here from the Service Action Code “FB”.

Supplies needed:

- Lubricant #6 (P/N 106403)
- Krytox Lubricant (P/N 106404)
- Q-tip swabs or cotton cloth

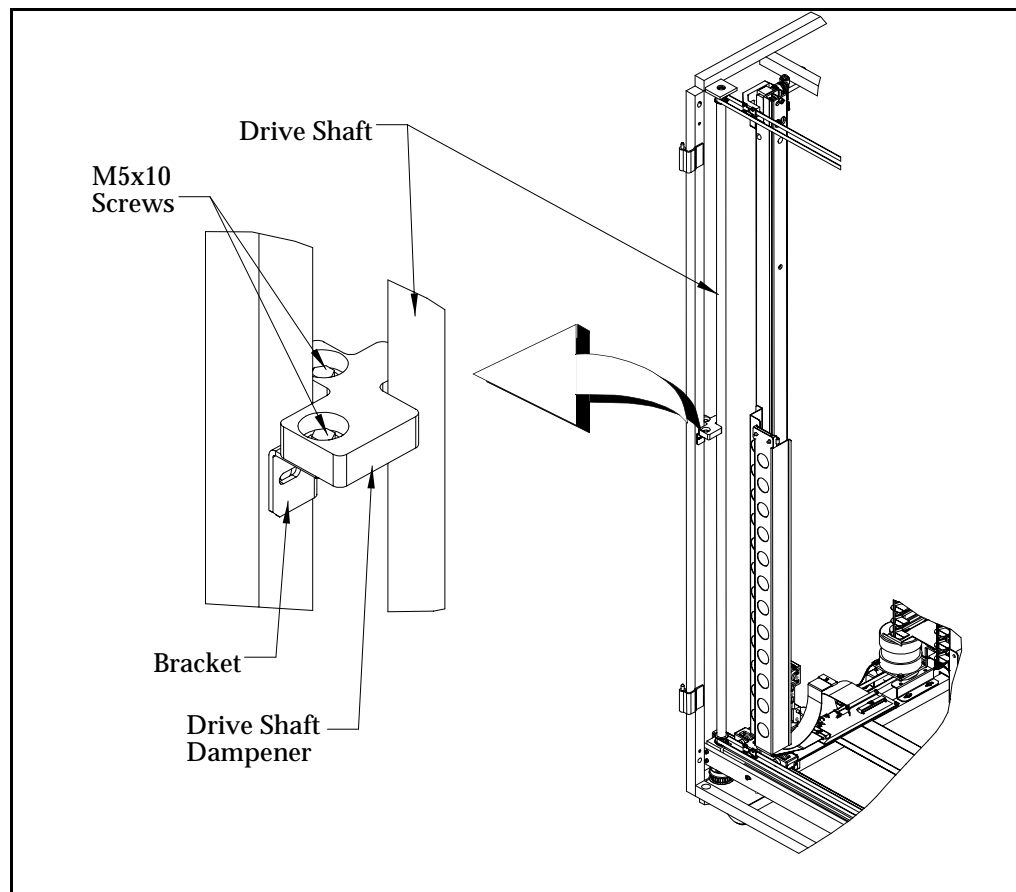
 **Note**  
The bearing rods are located on the X-Axis and Y-Axis assemblies which the X and Y rail rollers are riding on.

 **Note**  
Wash your hands after applying the lubricants to avoid any possible adverse reactions to one of the lubricants.

- Step 1** Lubricate the 8 wiper pads on the X-axis (2 top and 2 bottom) and Y-axis (2 front and 2 back) with Lubricant #6 (Refer to Figure 7-7 on page 7-9 and Figure 7-8 on page 7-10 for locations of the wiper pads). **Do not over lubricate these pads.**
- Step 2** Put a few drops of Lubricant #6 on a cloth and wipe the top and bottom X-rail bearing rods and the front and back Y-rail bearing rods. **Do not over lubricate.**
- Step 3** Apply a thin film of Krytox Lubricant on both Gripper Assembly shafts. Refer to Figure 7-9 on page 7-11 for locations of the shafts.
- Step 4** Adjust the drive shaft dampener to ensure that it's touching the drive shaft by loosening the 2 M5x10 screws that hold the dampener to the bracket, slide the dampener forward until it's touching the drive shaft. Refer to Figure 8-20 on page 8-72 for this procedure. **The dampener should only touch the drive shaft lightly.** If the dampener appears worn and cannot be adjusted, replace it with a new one (P/N 301074).
- Step 5** Retension all belts (Top and Bottom X-Axis belts and Y-Axis belt) by releasing the lock screws on the tensioners using a 5mm Hex wrench, the belts will be retensioned automatically. Re-tighten the lock screws.
- Step 6** Vacuum any debris near the bottom of the drive shaft.
- Step 7** Remove the Gripper Assembly cover and clean the Barcode Scanner window with a clean, dry Q-tip or cotton cloth.

**Step 8** Inspect the O-rings on the Gripper Touch Tip Roller and make sure that they are in good conditions. Replace the O-rings if they are dry-rotting. Refer to Procedure *Touch Tip Roller O-rings* on page 8-33.

**Step 9** Use the Operator Panel to execute the function that resets all counters used in generating this Preventive Maintenance Service Action Code (Main Menu >Service >Start).



**Figure 8-20** Drive Shaft Dampener Adjustment

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## Power Supplies Check Procedure

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to get access to the components mentioned in this procedure. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.

**Step 1** Check the +24V DC Power Supply by observing the +24V Good LED on the LMC (Machine Control) card. Refer to Figure 7-17 on page 7-19 or Figure 7-18 on page 7-20 for location of the +24V Good LED. If this LED is not On, replace the Power Supply by using Procedure *+24V DC Power Supply* on page 8-67.

**Step 2** Check the +48V DC Power Supply by observing the LEDs on both Power Amplifiers. Refer to Figure 7-28 on page 7-25 for location of the LED. If both LEDs are not On, replace the Power Supply by using Procedure *+48V DC Power Supply* on page 8-68.

**Note:** If your Library has Firmware 2.3 level or later installed, use the Operator Panel to perform the above 2 steps (Main Menu >Service >Diags >PowerSup). The screen will show:

```
1. 24V DC:Y/N AC:Y/N
1. 48V DC:Y/N AC:Y/N
2. 24V DC:Y/N AC:Y/N
2. 48V DC:Y/N AC:Y/N
```

The first two lines are used to indicate status of the standard Power Supplies and the last two lines are shown only if the Dual Power Supplies feature is installed. The DC output and AC input status of each Power Supply is displayed: Y indicates good status and N indicates failing status.

**Step 3** The problem you are sent here can be caused by a blown F1 fuse (7A) on the LMC card. Refer to Figure 7-17 on page 7-19 or Figure 7-18 on page 7-20 for location of the fuse. If the fuse is blown, replace the fuse and power up the Library. If the fuse continues to blow, go to Figure 9-2 on page 9-5 to isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.

---

---

## Microcode Support Procedures

The following procedures require either a PC equipped with an RS-232 port and a **straight through** serial cable (P/N 301466, a null modem cable will not work), a 3.5" diskette drive and Windows 95 or the customer's SCSI host initiator.

### Updating Microcode

#### Using the PC

Refer to Figure 7-13 on page 7-15 or Figure 7-15 on page 7-17 and Figure 7-16 on page 7-18 for locations of components.

**Locate the Scalar 1000 Microcode diskette, load it in the PC and follow the procedure in the Release Notes that came with the Scalar 1000 Microcode diskette.**

#### Using the SCSI Host Initiator

The Scalar 1000 microcode can also be downloaded into the library using the SCSI "**Write Buffer Command**" from the SCSI Host Initiator. The buffer ID of the microcode is 1, and the mode is 5 (download microcode and save). The microcode can be downloaded all in one command, or broken down into segments. If it is segmented, the segments must be sent in order from lowest address to highest, and must be contiguous.

The last segment sent (or the only segment, if it is sent all at once) must have a time-out no smaller than 2 minutes.

For example, to download in one piece, use the following CDB (in hexadecimal):

3b 05 01 00 00 00 07 80 00 00

Where:

3b	Op code for Write Buffer Command
05	LUN = 0, Mode = 5
01	buffer ID = 1
00 00 00	buffer offset = 0 (start from the beginning)
07 80 00	491,520 is the size of the data to download
00	control bits

---

---

The data associated with this Write Buffer Command should be the entire microcode file (491,520 decimal bytes)

As another example, to download the microcode in segments of 32KB pieces, use the following CDBs (in hexadecimal):

CDB: 3b 05 01 00 00 00 00 80 00 00 Data: 0x8000 bytes starting at 0x00000  
CDB: 3b 05 01 00 80 00 00 80 00 00 Data: 0x8000 bytes starting at 0x08000  
CDB: 3b 05 01 01 00 00 00 80 00 00 Data: 0x8000 bytes starting at 0x10000  
CDB: 3b 05 01 01 80 00 00 80 00 00 Data: 0x8000 bytes starting at 0x18000  
CDB: 3b 05 01 02 00 00 00 80 00 00 Data: 0x8000 bytes starting at 0x20000  
CDB: 3b 05 01 02 80 00 00 80 00 00 Data: 0x8000 bytes starting at 0x28000  
CDB: 3b 05 01 03 00 00 00 80 00 00 Data: 0x8000 bytes starting at 0x30000  
CDB: 3b 05 01 03 80 00 00 80 00 00 Data: 0x8000 bytes starting at 0x38000  
CDB: 3b 05 01 04 00 00 00 80 00 00 Data: 0x8000 bytes starting at 0x40000  
CDB: 3b 05 01 04 80 00 00 80 00 00 Data: 0x8000 bytes starting at 0x48000  
CDB: 3b 05 01 05 00 00 00 80 00 00 Data: 0x8000 bytes starting at 0x50000  
CDB: 3b 05 01 05 80 00 00 80 00 00 Data: 0x8000 bytes starting at 0x58000  
CDB: 3b 05 01 06 00 00 00 80 00 00 Data: 0x8000 bytes starting at 0x60000  
CDB: 3b 05 01 06 80 00 00 80 00 00 Data: 0x8000 bytes starting at 0x68000  
CDB: 3b 05 01 07 00 00 00 80 00 00 Data: 0x8000 bytes starting at 0x70000

The data for each of these Write Buffer commands should be the sequential 32 KB pieces of the microcode file.

---

---

# Retrieving Error log, Trace data and Microcode Dump

## Using the PC

### **Note**

This procedure is supported **ONLY** via the term.exe program Version 2.44 or higher. The term.exe program is included as part of the Firmware diskette.

Refer to Figure 7-13 on page 7-15 or Figure 7-15 on page 7-17 and Figure 7-16 on page 7-18 for locations of components.

**Step 1** Open the rear door of the Control Module and connect the PC COM1 port to the LSC card RS-232 Service Port.

**Note:** Recent C20 and C30 models have an electronics cover that must be removed to get access to the LSC card. Refer to Procedure *CM Electronics Cover* on page 8-80 for instructions on how to remove this cover.

**Step 2** Use the Library Op panel to enable the Service port (Main Menu >Setup >Library >Serial >).

**Step 3** Select a DOS prompt from the Windows PC and copy the term.exe program into the selected directory.

**Step 4** Issue the following command from the DOS prompt to upload the code dump (-D) via COM1 (-C1) at a baud rate of 19200 (-B19200) to the file called "mydump.dmp" :

```
term -D -C1 -B19200 -Fmydump.dmp
```

**Step 5** Once the dump is retrieved, disable the Service port using the Library Op panel as in Step 2.

## Using the SCSI Host Initiator

The Scalar 1000 Error log, Trace data and Microcode Dump can also be retrieved using the SCSI "**Read Buffer Command**" from the SCSI Host Initiator.

**Step 1** Issue the following CDB (in hexadecimal) to find the buffer size:

```
3c 03 00 00 00 00 00 00 04 00
```

Where:

3c	Op code for Read Buffer Command
03	LUN = 0, Mode = 3 (descriptor)

---

---

00	buffer ID = 0
00 00 00	buffer offset = 0 (start from the beginning)
00 00 04	the size of the data to upload is 4 bytes
00	control bits

The data returned by this command is:

02 00 a8 74

Where:

02	The buffer offset must be a multiple of 2 <sup>2</sup> or 4 bytes
00 a8 74	The buffer size is 0x00a874 bytes

**Step 2** Issue the following CDB (in hexadecimal) to retrieve the buffer:

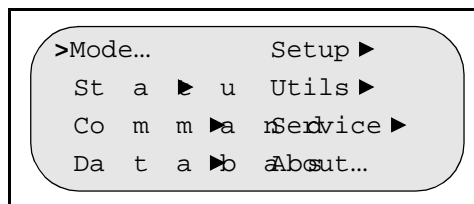
3c 02 00 00 00 00 00 a8 74 00

Where:

3c	Op code for Read Buffer Command
02	LUN = 0, Mode = 2 (data)
00	buffer ID = 0
00 00 00	buffer offset = 0 (start from the beginning)
00 a8 74	43,124 is the size of the data to upload
00	control bits

## Forcing a Microcode Dump

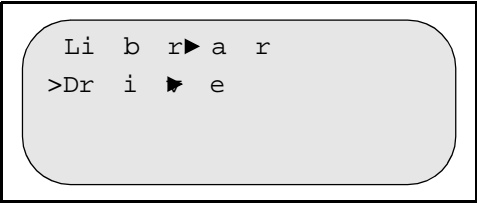
**Step 1** Select “Utils” from the following Operator Panel Main Menu:



**Step 2** Select “Library” from the following menu:

---

---



```
Librarian
>Dri e
```

**Step 3** Select “Dump” from the following menu:



```
Screen...
>Dump
Time...
Date...
```

---

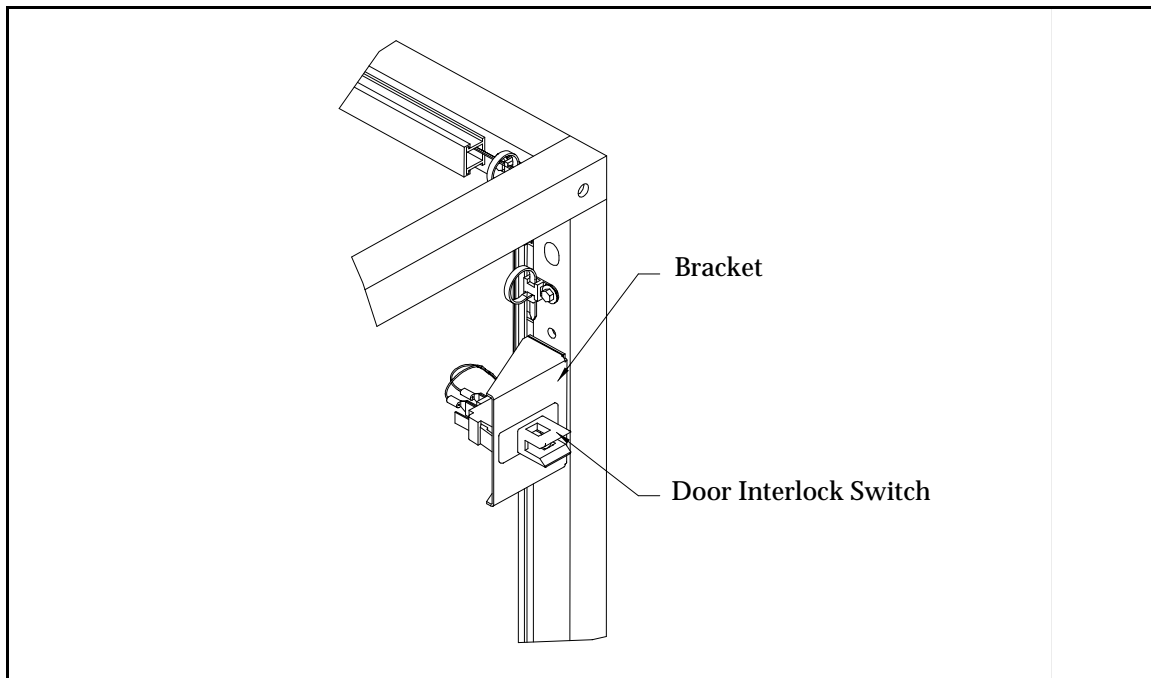
---

## Door Interlock Switch

The Door Interlock Switch Part Number can be found on Table 8-1 on page 8-6. See Figure Figure 8-21 below

### Removing the Door Interlock Switch

- Step 1** Power Off the Library Control Module by setting the Power Supplies switch on the AC Power Compartment to the Off position.
- Step 2** Open the front door of the module where the switch is located and disconnect the cables to the switch.
- Step 3** Remove the switch from the bracket.



**Figure 8-21** Door Interlock Switch Removal and Replacement

### Replacing the Door Interlock Switch

Perform the above procedure in reverse order.

---

---



## CM Electronics Cover

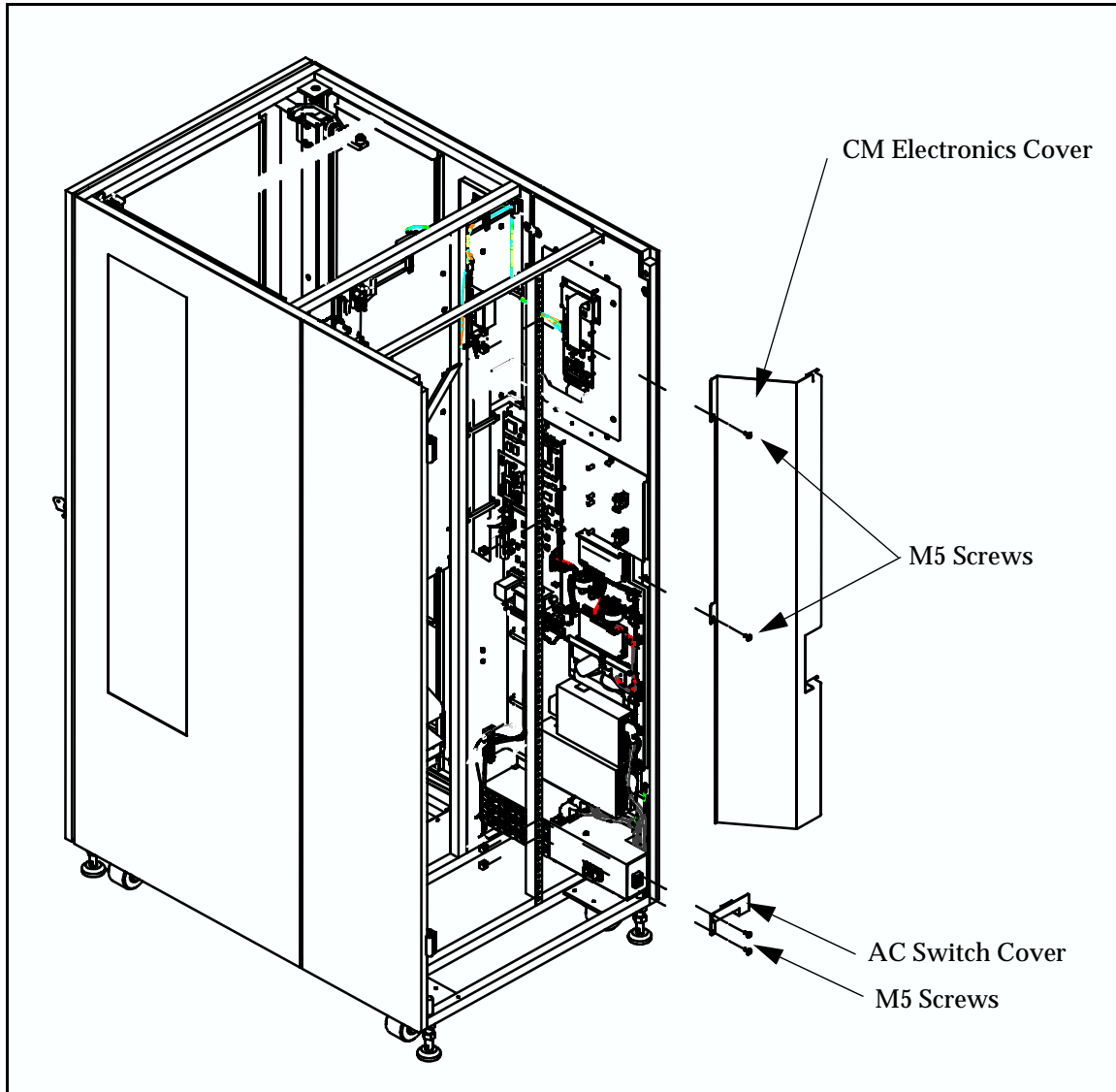
Recent models of the Scalar 1000 has an electronic cover. See Figure Figure 8-22 on page 8-81.



### Removing the Electronics Cover

- Step 1** Power Off the Library Control Module by setting the Power Supplies switch on the AC Power Compartment to the Off position.
- Step 2** Open the rear door of the Control module.
- Step 3** Loosen the two M5 screws attaching the Electronics cover to the rack.
- Step 4** Lift up the Electronics cover and swing it out toward you to remove it.

**Note:** If you are here to replace the AC Power Compartment, you also need to remove the AC Switch cover as shown in Figure 8-22 on page 8-81.



**Figure 8-22** Control Module Electronics Cover Removal and Replacement

## Replacing the Electronics Cover

Perform the above procedure in reverse order.

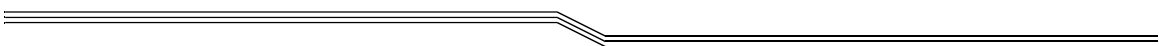
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# 9

## Power

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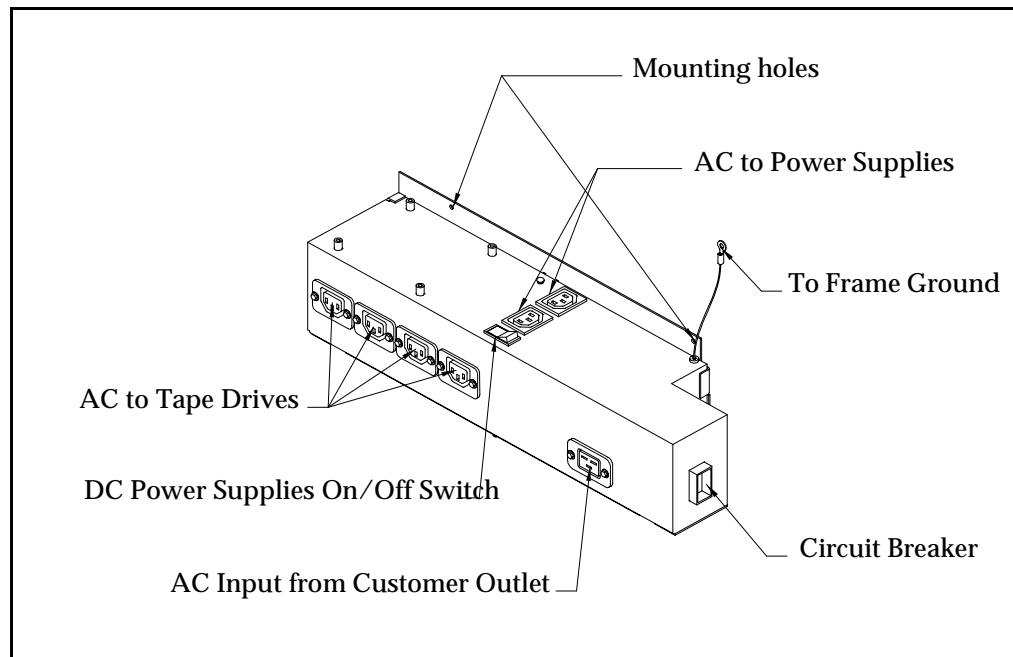
## Overview

This chapter describes the Scalar 1000 Power system.

### AC & DC Power

The Scalar 1000 Control Module and Expansion Module contain an AC Power Compartment (APC) that requires 110V or 230V, 10 to 20 Amperes single phase AC power. The customer provides AC power to each module. There are two models of the AC Power Compartments: one contains 4 AC outlets to supply AC to Tape drives and the new style has 12 AC outlets providing AC to Tape drives.

Figure 9-1 on page 9-3 shows the Scalar 1000 grounding circuit, the AC Power Compartment is physically grounded to the frame with a green wire with yellow stripe.



**Figure 9-1** AC Power Compartment (with 4 AC outlets for tape drives)

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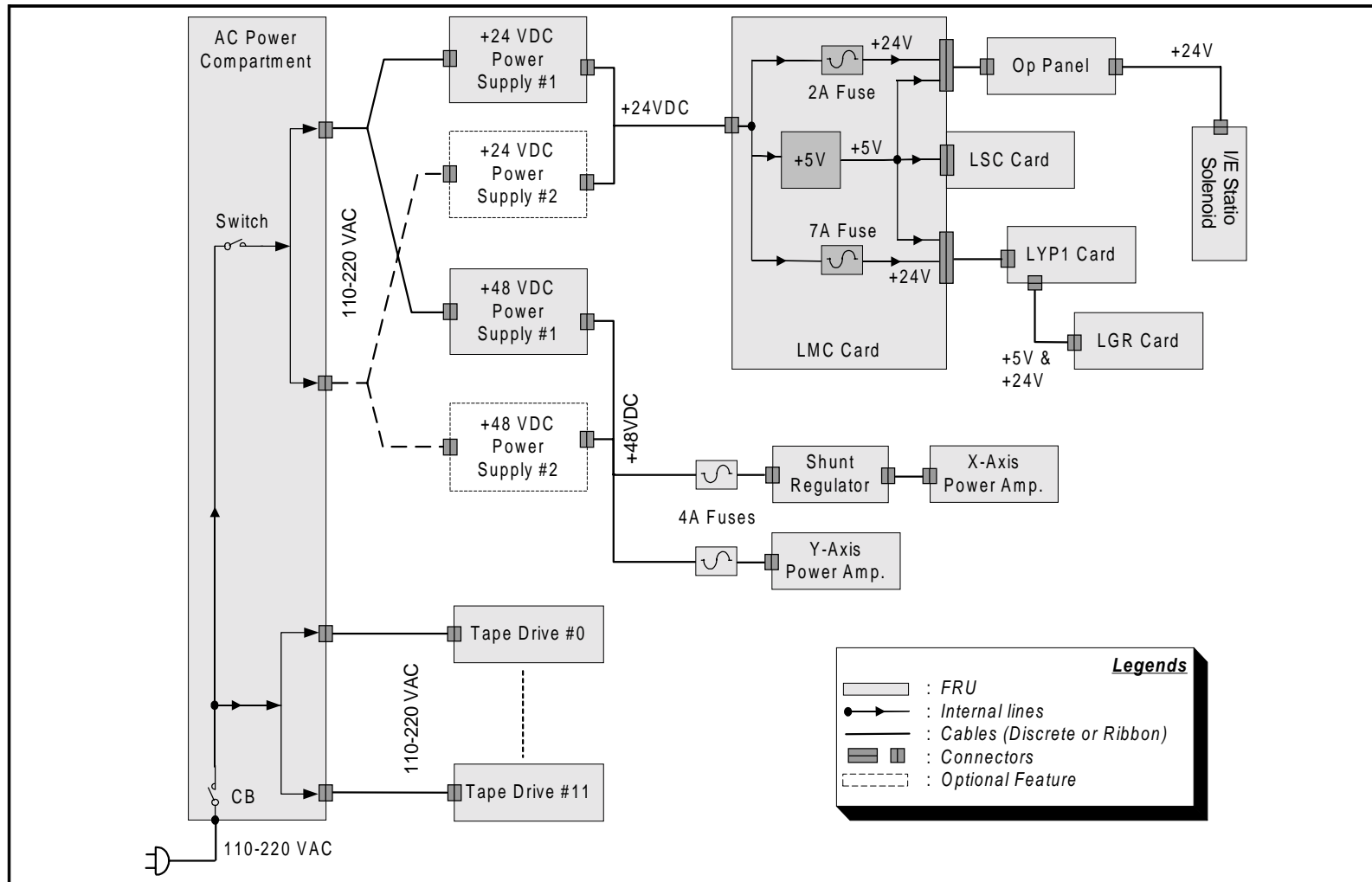


## AC & DC Power Distribution Overview

AC power is distributed by the AC Power Compartment in each Control and Expansion Module. The APC provides either 4 or 12 AC outlets for use by the Tape Drives and 2 AC outlets for use by the DC Power supplies.

The output of the APC is controlled by a Circuit Breaker and a switch. AC to the Drives is immediately available when the Circuit Breaker is On, AC to the Power Supplies are available when the switch is On (the DC Power Supplies are only installed the Control Module).

Figure 9-2 on page 9-5 shows the AC and DC power distribution for the Scalar 1000 (note that this diagram only applies to the power distribution in the Control Module). The +24VDC and the +48VDC are generated from the DC power supplies and +5VDC is generated by a DC to DC Power Converter in the LMC card.



**Figure 9-2** AC and DC Power Distribution Diagram

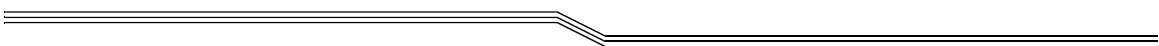
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# 10

## Cables

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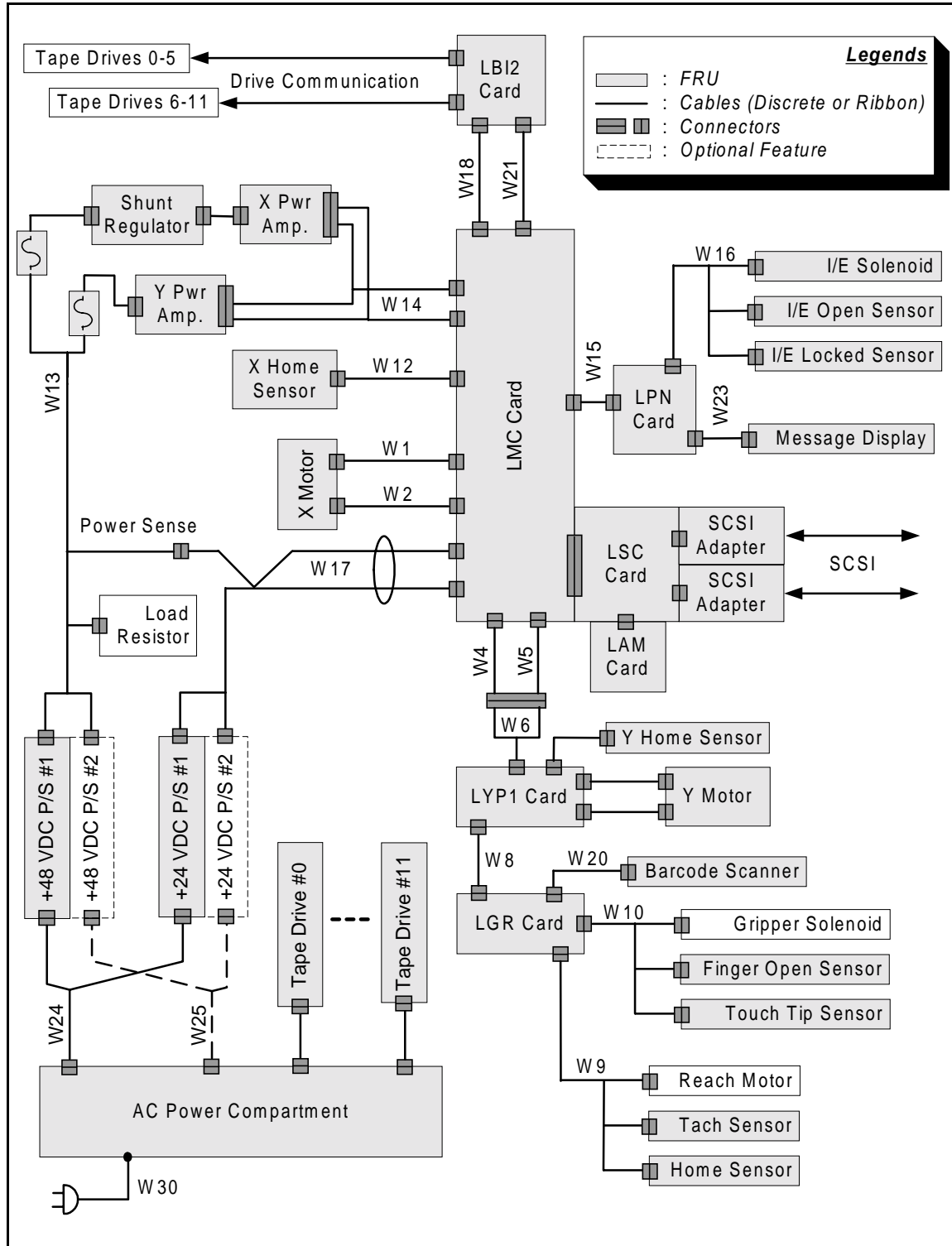
## Overview

This chapter shows the interconnections between major components in the subsystem.



## Diagrams

The following diagrams show the connectors and cables designation. The cables are designated with a Wxx symbol.

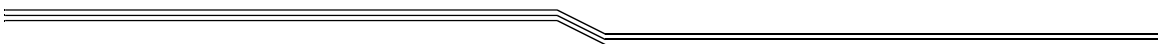


**Figure 10-1** Scalar 1000 Cable Diagram

# 11

## Installation

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## Overview

This chapter contains step by step procedure to install all models of the Scalar 1000. Expansion Module E10 must be attached to frame models C10 or E10, Expansion Module E20 must be attached to frame models C20 or E20 and Expansion Module E30 must be attached to frame models C30 or E30.

**The x10, x20 and x30 frames cannot be intermixed.**

The figures used in this chapter illustrate Models C10 and E10 but the installation procedure is identical for Models C20 and E20 or C30 and E30.

## Installation

### Pre-Installation

The Scalar 1000 can include up to 4 frames. The Control Module frame is always on the left and additional Expansion Module frames are installed to the right side. The right side front and rear covers are removed from the Control Module frame and are installed on the last Expansion Module frame.

Parts required for installation are shipped with each frame. When unpacking the frames and removing the packing material, do not lose or misplace any enclosed parts.

The door keys (one for the front door and one for the back door) are shipped with each frame. The key with the square opening is for the back door of the Control Module and the Expansion Module frames. It should be kept with customer personnel who's responsible for changing the library configuration.

**Step 1** Familiarize yourself with these instructions. When installing more than 1 frame, especially understand how to keep the frames together at the top and bottom.

**Step 2** If the customer has existing tape drives that must be converted to Library models and installed in the Scalar 1000, familiar yourself with the instructions for that tape drive.



## Special Tools

See the Maintenance manuals shipped with your tape drives for the special tools supplied with the tape drives.

**Table 11-1** Special Tools

Part Number	Tool Description	Usage
Commercial Part	Any level 18 inches or longer	Level frames when adding an Expansion Module.

---

---



## Unpacking

Use the instructions supplied with the Scalar 1000 to unpack. When you take off the packing material from the parts in the base of the frame, put the parts in a safe area so they will not get damaged.

- Step 1** Move the Control Module (CM) frame in place. If it is installed on a raised floor, ensure the hole cut-out is placed under the rear of the frame.
- Step 2** Locate the set of keys, which are in an envelope taped to the top of the frame.
- Step 3** Open the front door using the key with the triangular opening.
- Step 4** Remove the packing foams under the bottom of the Gripper assembly, the top X-rail and the bottom X-rail.
- Step 5** Cut the 2 plastic ties that fasten the Accessor assembly to the drive shaft.
- Step 6** Cut the plastic tie that fastens the Accessor assembly to the X-rail.
- Step 7** Cut the plastic tie on the Gripper assembly.
- Step 8** Cut the 2 plastic ties located on the Insert/Eject Station.
- Step 9** Open the rear door and remove the shipping bracket (one per two drives), the foam and cardboard packing material between Tape drives (if the Tape Drives are installed on this frame).
- Step 10** Keep all the parts in a safe place to keep them from being damaged.



## Adding Additional Frames

If you are adding additional Expansion Module frames to an existing library, go directly to *Expansion Module* on page 11-8 and complete the remainder of the instructions as needed.

If you are installing a new library, continue with the next section.

---

---


## Control Module

Refer to Figure 11-1 on page 11-7

**Step 1** If the Scalar 1000 is installed on a raised floor, have the customer supply you with a floor cut-out for the Control Module frame.

**Step 2** Loosen the locknuts on the leveling pads and lower them to the floor. The pads should be approximately 6 mm (.25 inch) from the floor.

**Important:** The leveling pads for recently shipped frames are not installed to prevent damage during shipping, they are located in a plastic bag in the rear of the frame. Position these leveling pads underneath the feet (bolts) so the pads will attach to the feet when you lower them.

 **Note**  
The doors should be closed when performing this step.

**Step 3** Position the Control Module frame by measuring from the floor to the bottom of the frame on all corners. Use an adjustable wrench to adjust the leveling pads so that the clearance from the floor to the bottom of the frame is approximately 100 mm (4.0 inches). Use the level to ensure that the frame should be approximately level and parallel with the floor and the casters should be off the floor.

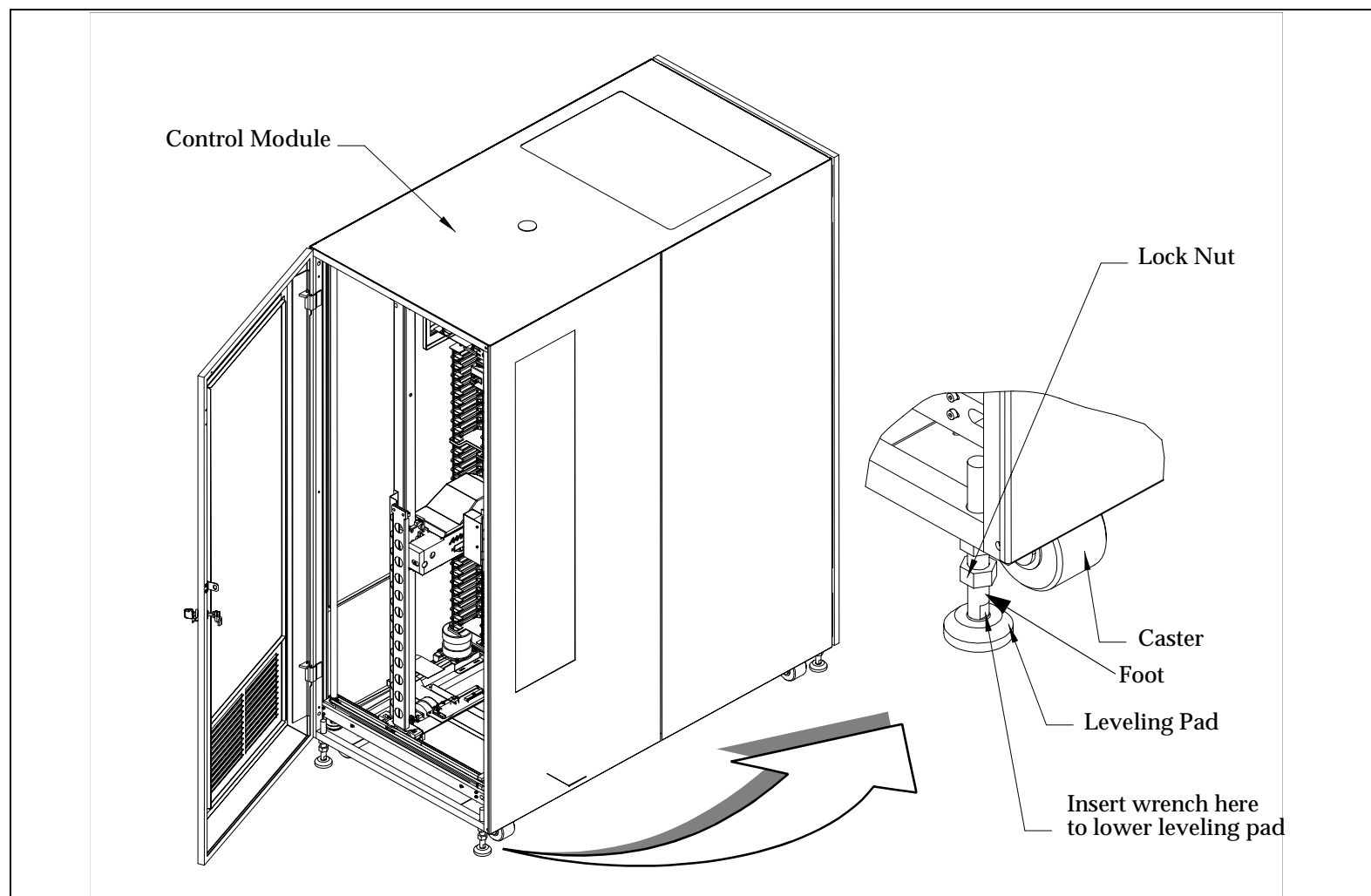
**Step 4** Move the cartridge accessor vertically and horizontally to ensure that all packing material was removed and no binds exist.

**Step 5** If you are installing customer supplied tape drives in the Scalar 1000, go to *Install 3590/3590E Model B1A/E1A in a Scalar 1000* on page 11-23, and then return to Step 6.

**Step 6** If you are installing any Expansion Module (EM) frames, go to *Expansion Module* on page 11-8 then return here.

**Step 7** Tighten the lock nuts on the leveling pads after all frames are installed.

**Step 8** If no other frames are being installed, go to *Cables from Hosts* on page 11-27



**Figure 11-1** Control Module Frame - Model C10

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---

## Expansion Module

Refer to Figure 11-2 on page 11-10 and Figure 11-3 on page 11-11.

### Note

Remove the bottom screw first. You may need to put the tape drive in Service position to have better access to the screws.

**Step 1** If the Scalar 1000 is installed on a raised floor, have the customer supply you with floor cut-outs for the Expansion Module (EM) frames.

**Step 2** On the Control Module (CM) or the end frame in the library, remove the six screws from the right **front** side cover, then remove the cover and set it aside. You will install the cover on the last frame in the subsystem after you install all the X-rail assemblies.

**Step 3** On the Control Module (CM) or the end frame in the library, remove the six screws from the right **rear** side cover, then remove the cover and set it aside. You will install the cover on the last frame in the subsystem after you install all the X-rail assemblies.

**Step 4** Move the cartridge accessor assembly to the home position (left side of the Control Module frame).

**If the installation of this Expansion module is part of an original Scalar 1000 installation, the spacers mentioned in the next two steps are already installed at the factory. Skip the next two steps and be sure to install the Expansion Modules in the order marked outside the frames.**

### Note

Spacers should be installed flushed to top of frame and centered on the frame member tube.

**Step 5** Install the front spacer (P/N 301019) with two M5x30 screws (P/N 106384) on the Control Module (or the last frame installed). Do not tighten the screws.

**Step 6** Install the rear spacer (P/N 301019) with two M5x30 screws (P/N 106384) on the new Expansion Module frame. Do not tighten screws.

**Step 7** Slide the shoulder bolts (P/N 106382) starting with the bottom one first (all shoulder bolts are installed left to right) through the large hole on the tube and the spacer and use them as guides to align the spacers to the frames. Tighten the M5x30 screws that hold the spacers then remove the shoulder bolts.



---

---

**Step 8** If you have already installed an expansion frame during this installation, skip to **Step 15 on page 11-12**.

If you are installing the first expansion frame, remove the top and bottom X-axis belts, crash stop, the X-rail end cap and both X-Axis Tensioners (top and bottom) from the Control Module (or the end frame), refer to Figure 7-6 on page 7-8 and Figure 7-7 on page 7-9. Save these parts for later assembly in the last expansion frame.

**Step 9** Disconnect the X-Axis moving cable and slide the Accessor out of the Control Module without loosening the eccentric bolt. Use care when removing the Accessor and place it in a safe position to prevent damage to its components.

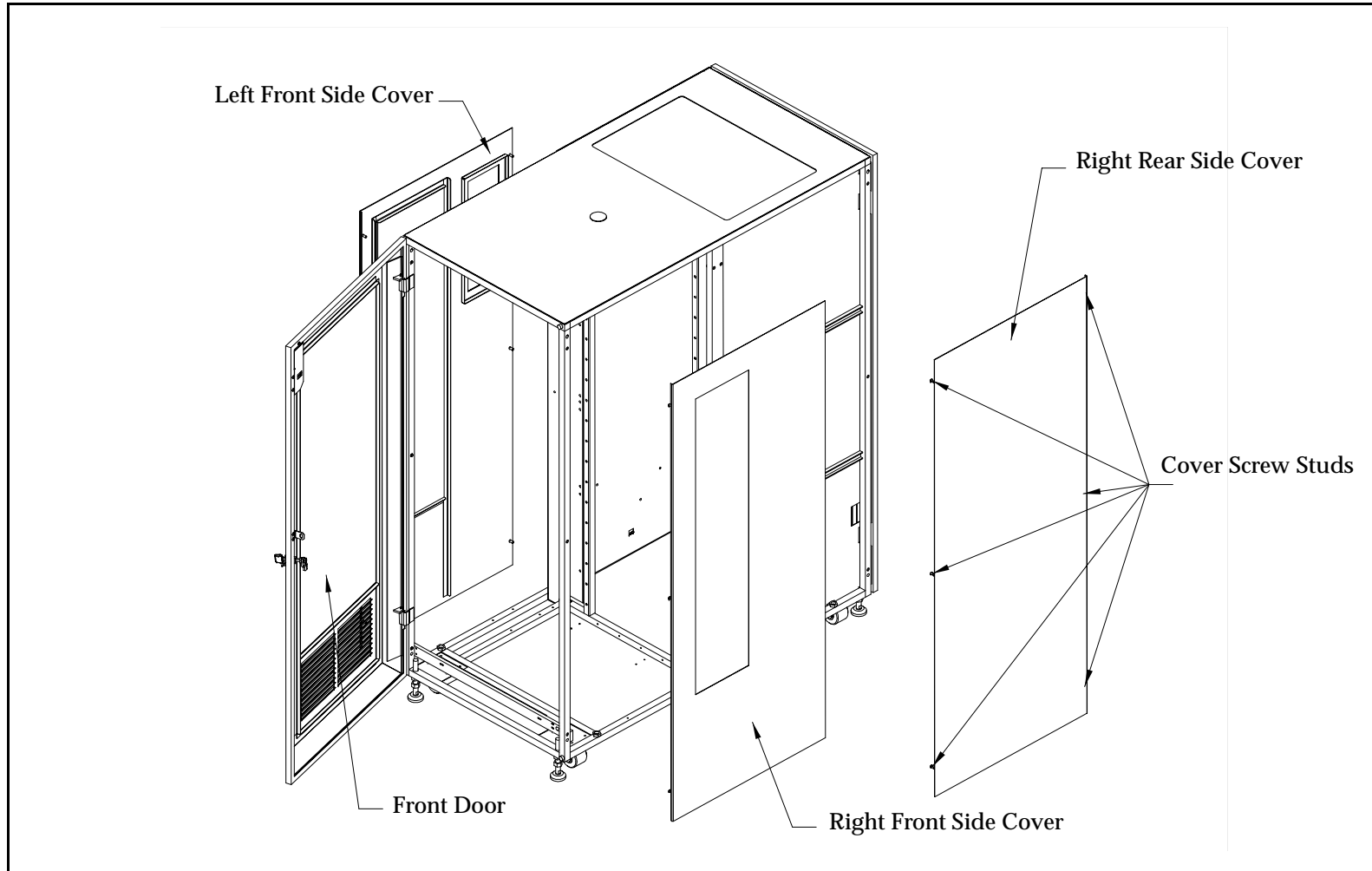
**Step 10** Disconnect the X-Axis home sensor. Remove the 2 M4x25 screws that attach the bottom X-rail to the Control Module frame and remove the X-rail.

**Note:** When an Expansion Module is shipped as an expansion upgrade, a complete matching set of X-rails are included in the ship group. It is important to align these X-rails properly.

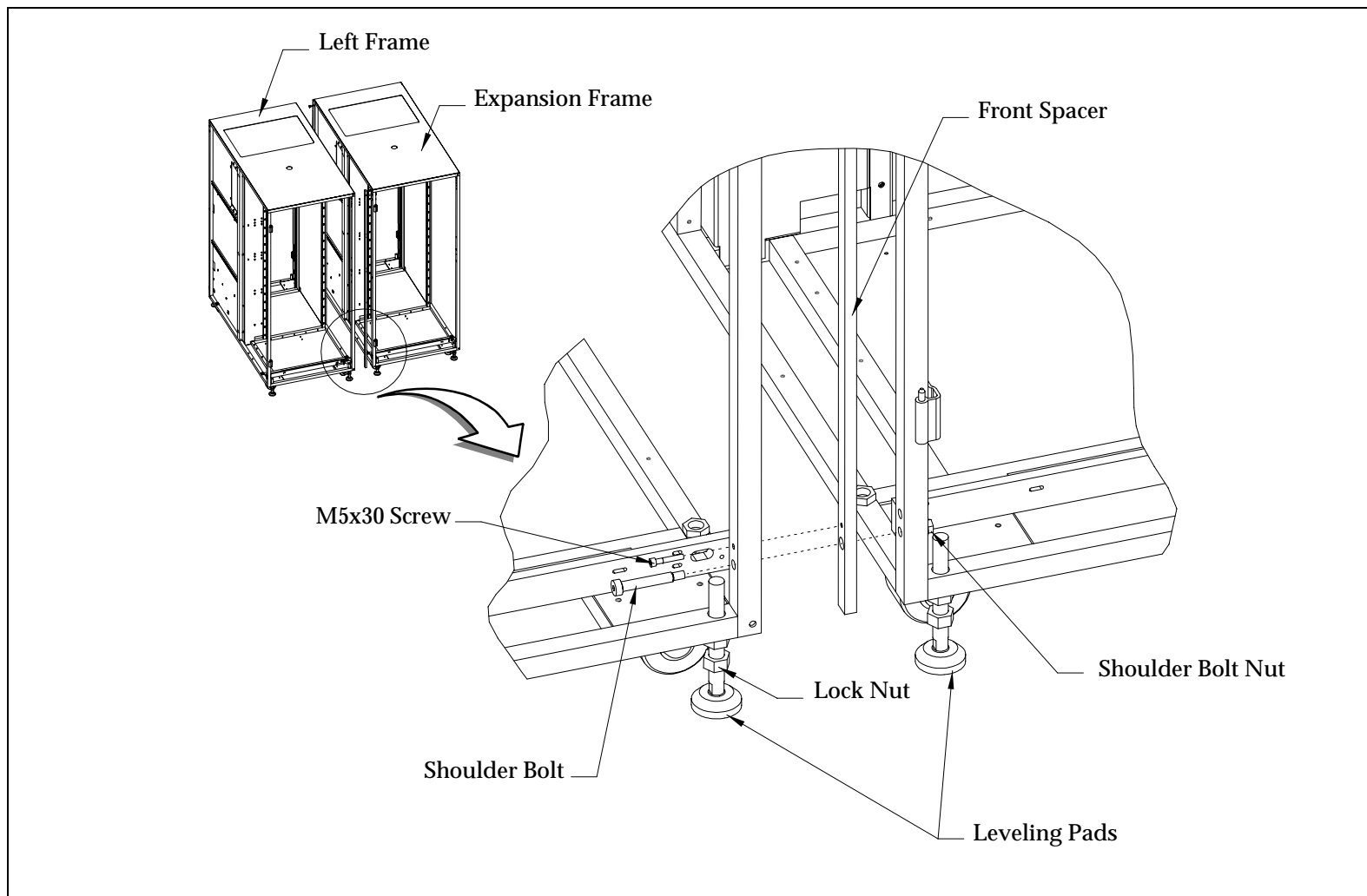
**Step 11** Install the new X-rail in the Control Module. Make sure there is a 5mm gap between this rail and the drive shaft housing as shown in Figure 11-4 on page 11-12. To do this, place a 5mm hex wrench between the drive shaft housing and the X-rail, slide the X-rail toward the drive shaft housing, then tighten the two screws that hold the X-rail in place. Remove the hex wrench.

**Step 12** Connect the X-Axis home sensor. Install the Accessor into the X-rail. Use extreme care not to cut or damage the felt wiper pads on the accessor rail carriage.

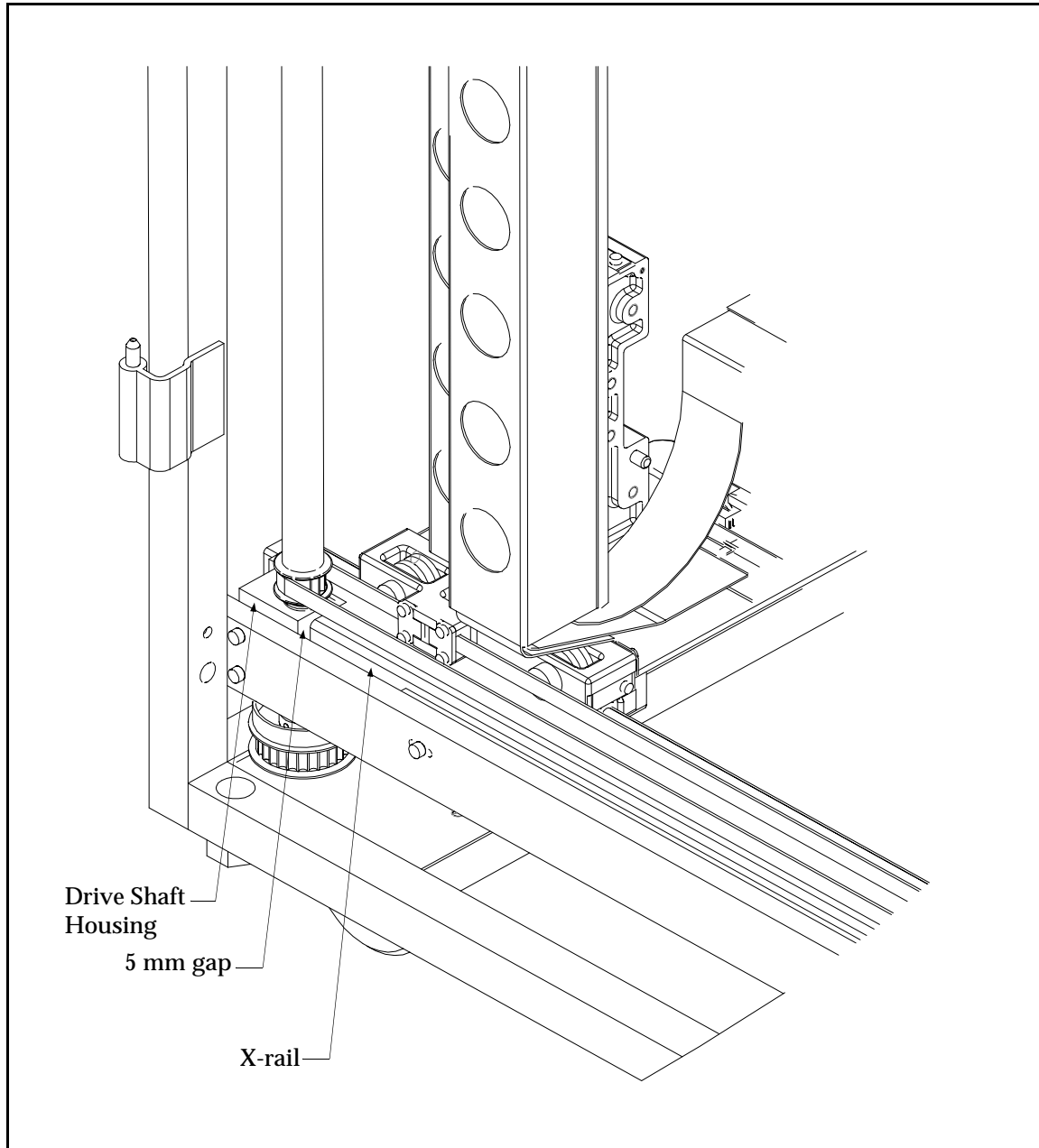
**Step 13** Check Accessor alignment to make sure it is straight and not twisting. Adjust the bottom eccentric bolt if necessary. Be extremely careful not to cause binding, accessor should move freely along the X-rail. Tighten the set screw on the eccentric bolt.



**Figure 11-2** Control Module or Left Frame Covers Removal (Model x10 shown)



**Figure 11-3** Frame to Frame Spacer Install (Model x10 shown)



**Figure 11-4** Centering the bottom X-rail in the Control Module

- Step 14** Remove the top X-rail from the new Expansion Module using a 7mm nut driver if it's installed. This will facilitate the next few steps.
- Step 15** Move the Expansion frame in place and verify that the installed frames are positioned correctly.

---

---

**Step 16** Use an adjustable wrench to adjust the leveling pads. The following steps are critical to ensure that the cartridge accessor does not bind during horizontal movement. Position the expansion frame following these steps:

**Important: The leveling pads for recently shipped frames are not installed to prevent damage during shipping, they are located in a plastic bag in the rear of the frame. Position these leveling pads underneath the feet (bolts) so the pads will attach to the feet when you lower them.**

- a. Raise the expansion frame by adjusting the leveling pads evenly, a small amount at a time, until the bottom of the frame is approximately even with the bottom of the left frame.
- b. Push the expansion frame up tight against the left (installed) frame and check the gap between the two frames. Adjust the leveling pads to minimize the gap.
- c. Install front bottom shoulder bolt first (you may need to use a rubber mallet to drive the shoulder bolt through the tube and spacer) then proceed with the front top shoulder bolt. Tighten firmly and then loosen  $\frac{1}{4}$  turn.
- d. Install the rear screws in the same manner. The shoulder bolts and the rear screws will be tightened later.

---

---



## X-Rail Assembly

Refer to Figure 11-5 on page 11-16 for locations of components in the following procedure:

**Step 1** Slide the bottom X-rail assembly in the Expansion frame toward the X-rail of the left frame (CM or EM). Check the height between the two rail extrusions. If there is a height difference, adjust the leveling pads on the Expansion Module up or down. Once the two X-rails are leveled, tighten the shoulder bolts and the rear screws.

Now slide the two X-rails together until their bearing rods (one on top and one on the bottom) touch. **Be careful not to damage the aluminum part of the X-rail assembly in the left frame when doing this.**

**Step 2** Attach the two X-rail assemblies together with 2 M6x12 screws.

**Step 3** Attach the bottom X-rail to the expansion frame using 2 M4x25 screws.

**Step 4** **Run your finger across the junction and ensure the bearing rods between frames are touching.** If the bearing rods have a gap between them, use a small punch and hammer to ensure **NO** clearance exists between the rods. **Do not damage the end of the rods.**

**Step 5** Position the level (18 - 24 inches) on the X-rail in the Expansion Module, check to ensure that the rail is approximately leveled. Adjust the expansion frame by using only the **right** leveling pads.

**Step 6** Install the top X-rail in the expansion frame using 2 M4x8 screws. Ensure the rail is mated smoothly with the X-rail in the left frame before tightening the screws.

**Step 7** Move the cartridge accessor across the junctions of the top X-rail and the bottom X-rail.

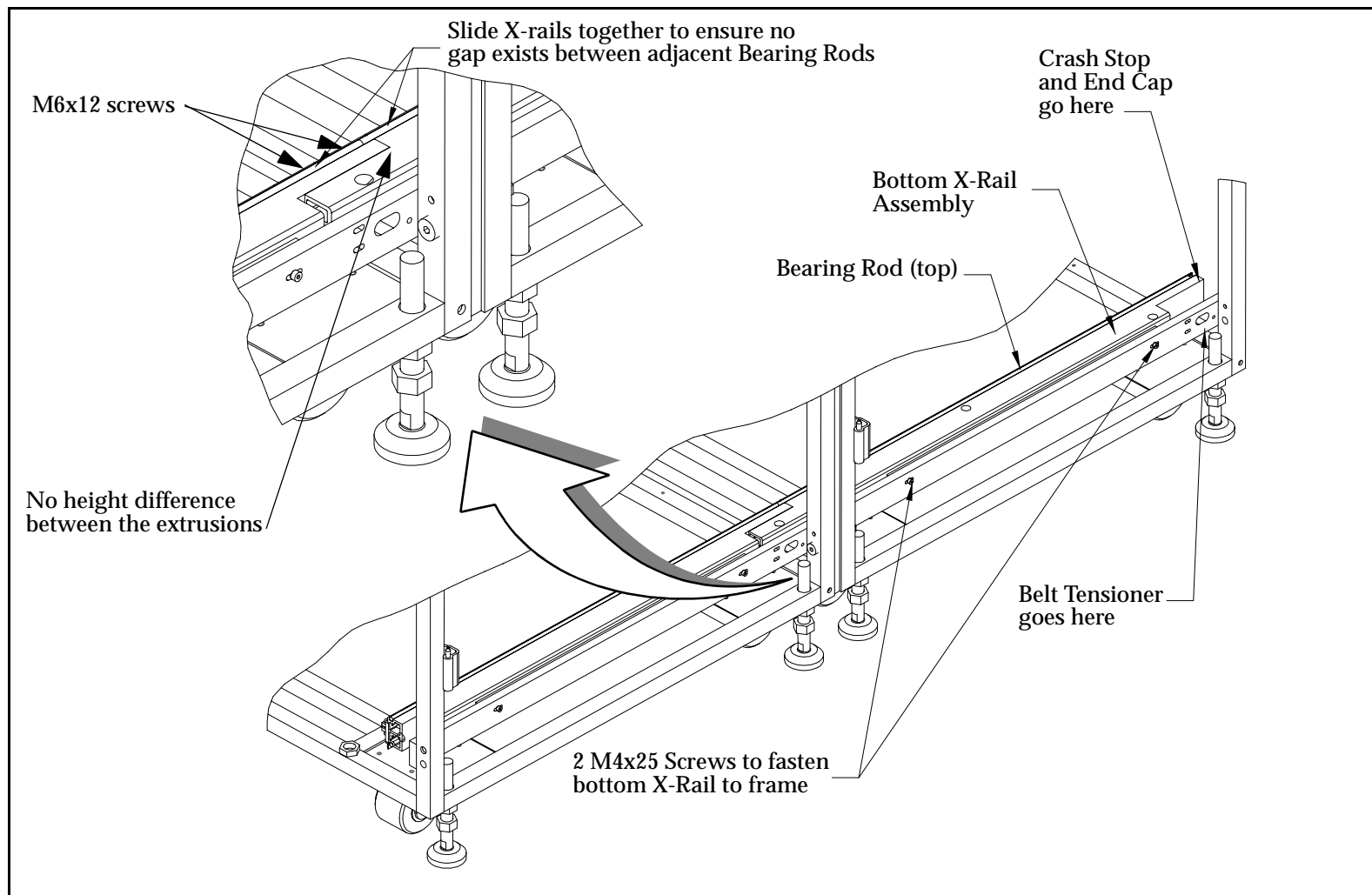
**Check the Accessor for binding and twisting. Adjust the eccentric bolt if necessary.**

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If there are more Expansion Modules to be installed, go to *Expansion Module* on page 11-8 and repeat the process, otherwise continue with the following steps.

- Step 8** Tighten the locknuts on the leveling pads starting with the center ones first.
- Step 9** Install the X-Axis tensioners (top and bottom) on the last frame.
- Step 10** Install X-Axis top and bottom belts, refer to *X-Axis Belt (Top or Bottom)* on page 8-35.
- Step 11** Install Crash Stop and the End Cap. You may need to adjust the two screws on the End Cap to make sure they touch the bearing rods.
- Step 12** If you are to install the customer's existing tape drives, use the Procedure *Install customer supplied Tape drives* on page 11-23, then return here.



**Figure 11-5** Install X-Rail Assembly

---

---

## Frame to frame cabling

Tape drives communication cables, Door interlock cables and Library X-Axis moving cable are installed using the following procedure:

### Drive Communication Cables

**This section only applies to Library or frame(s) that contains DLT, AIT or NCTP drives.** The Scalar 1000 supports communication between Library and tape drives for coordination of loading or unloading of cartridges and automatic cleaning of tape drives. Up to 12 tape drives can be installed in each frame and each group of 6 tape drives require one communication cable, this cable is connected to the LIB2 card on one end and the other end contains six connectors, one for each tape drive (they are labeled D0 to D5).

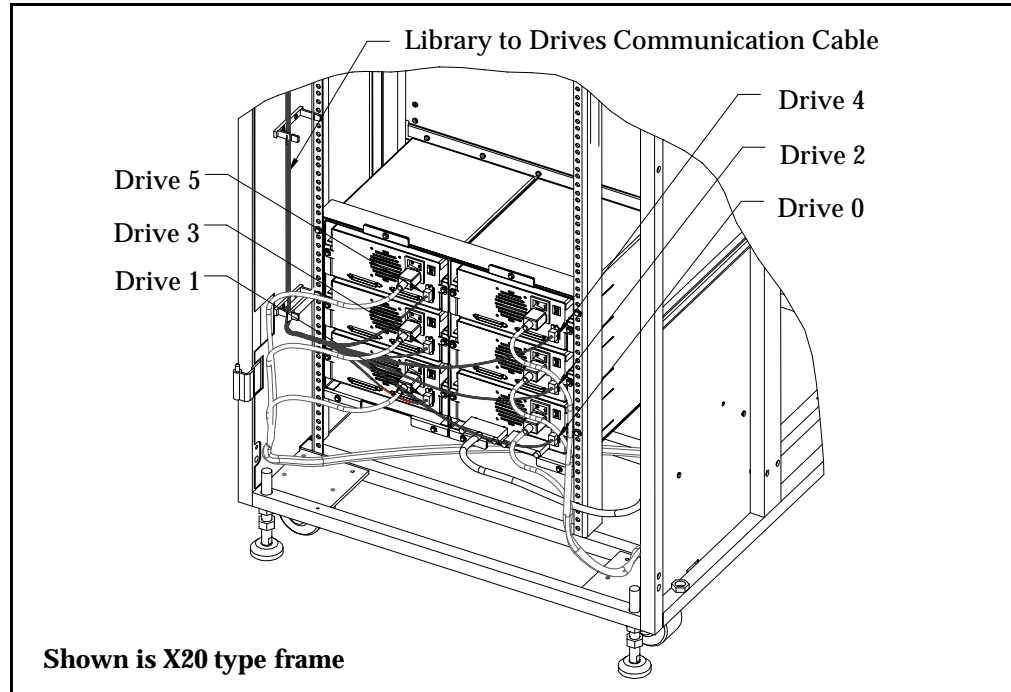
If you have more than 6 drives in the frame, an additional cable is required and the connector designated D0 will be assigned to tape drive number 6.

**Note: The Scalar 1000 addresses the DLT/NCTP and AIT Tape drives differently. Refer to Figure 11-6 on page 11-18, Figure 11-8 on page 11-19 and Figure 11-8 on page 11-19 for additional information.**

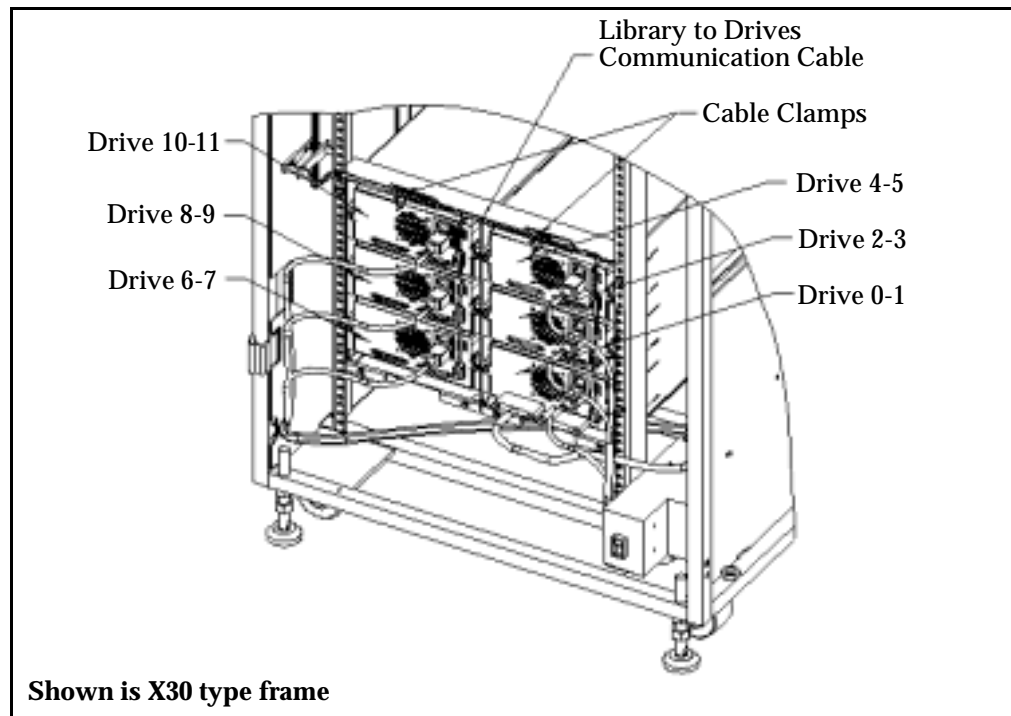
The LBI2 card has 2 connectors for the Drive communication cable, the bottom connector is used for tape drives 0-5 and the top connector is reserved for tape drives 6-11.

See on page 11-18 for the following procedure:

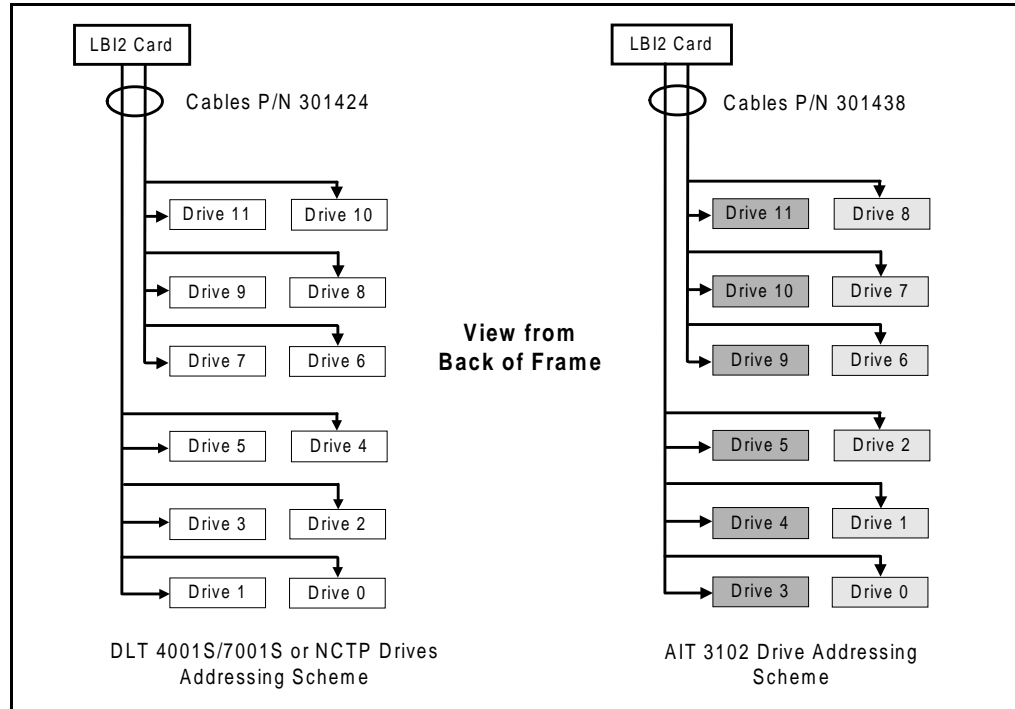
- Step 1** Plug the cable from each frame into the adjacent frame's LBI2 card. Route the cable in the channel in the top of each frame.
- Step 2** Ensure the Drive communication cable is properly connected at both ends.



**Figure 11-6** Library to DLT Tape drives communication cable



**Figure 11-7** Library to AIT Tape drives communication cable

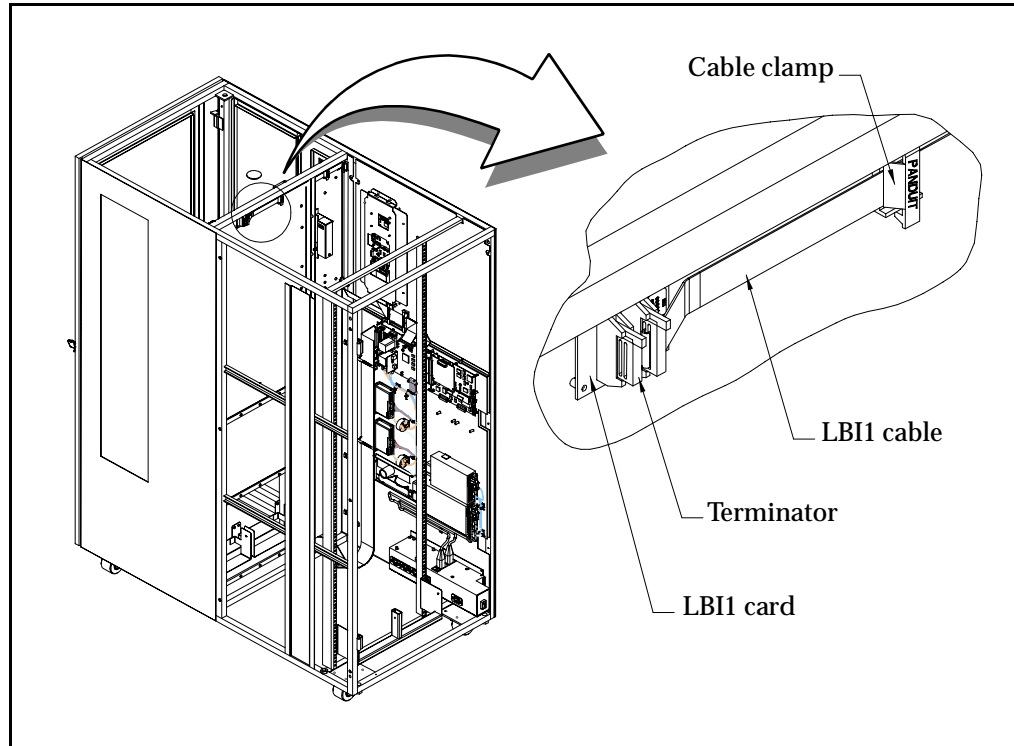


**Figure 11-8** Tape drives and Library communication addressing scheme

## Door Interlock Cables

See Figure 11-9 on page 11-20 for the following procedure:

- Step 1** Remove the door interlock terminator from the Control Module or the last frame installed.
- Step 2** Install the door interlock terminator in the last frame in the Library subsystem.
- Step 3** Plug the cable from each frame into the adjacent frame's door interlock card. Route the cable in the channel in the top of each frame.



**Figure 11-9** Door Interlock Cables and Terminator

## Library X-Axis Moving cable

**Step 1** Two different X-axis moving cables are used depending on the length of the Scalar 1000:

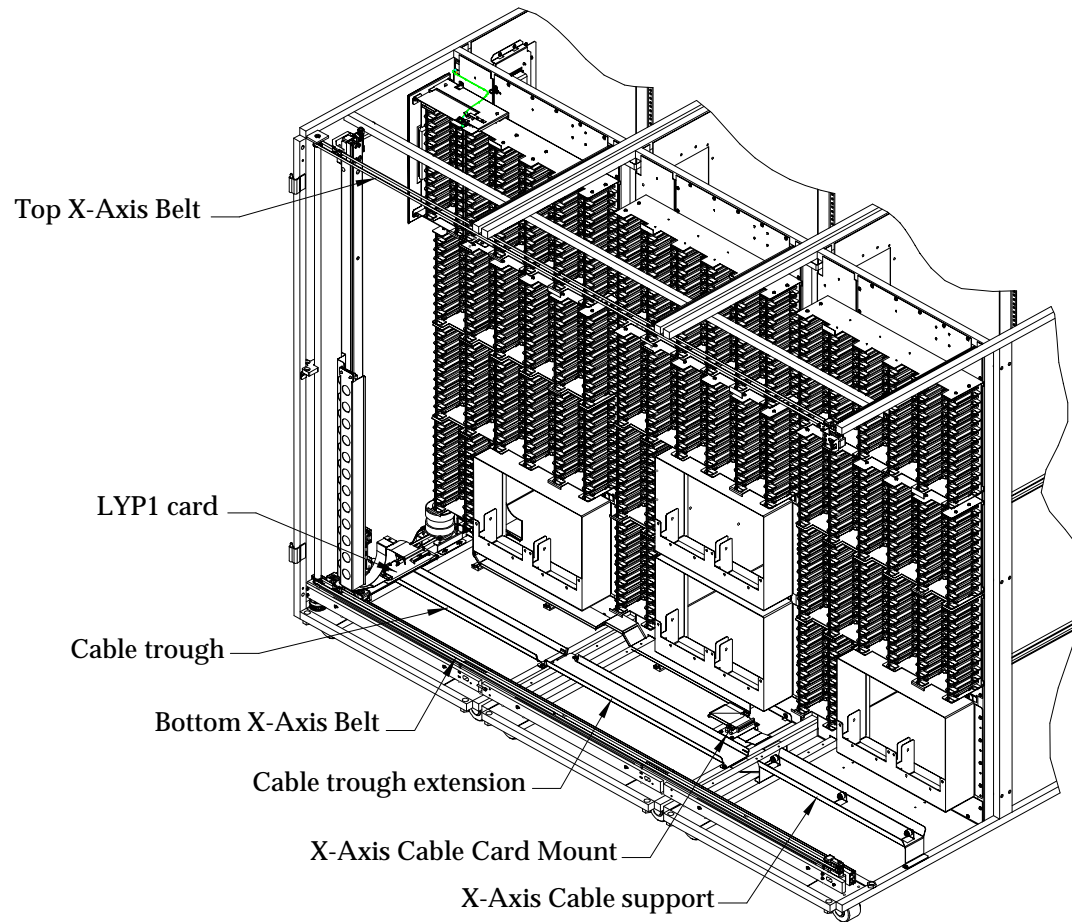
- 1-2 frames (1214 mm), P/N 301457
- 3-4 frames (2009 mm), P/N 301458

If your library has 1-2 frames or is not expanding across a cable boundary, skip this step and perform Step 2 on page 11-23.

If your library is expanding past a cable boundary (i.e. from a 1-2 frame library to a 3-4 frame library), a new X-axis moving cable and associated hardware will be shipped with the expansion frame(s). Install the X-axis cable using the following procedure, refer to Figure 11-10 on page 11-22.

- Move the cartridge accessor to the home position in the Control Module.

- 
- 
- b.** If you are adding expansion frames to an existing library, remove the old X-axis cable. Refer to procedure *X-Axis Moving Cable* on page 8-41 and then return here.
  - c.** Move the X-Axis Moving Cable Card Mount (P/N 301099) from the Control Module frame to the same position on the first Expansion Module. This is the end of the X-Axis moving cable that connects to the frame.
  - d.** Install the Cable trough extension (P/N 301098) on the first Expansion Module with 2 screws. This part is shipped with the expansion frame.
  - e.** Install the X-Axis cable support (P/N 301180) in the next Expansion Module with 2 screws. Repeat this step for the last Expansion Module (if present). This part is shipped with the Expansion Module.



**Figure 11-10** Library X-Axis Moving cable installation (3 frames configuration example)

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 **Note**

The length of the cable and the support band can make it difficult to control. It is fragile and can be damaged if you nick or put a kink in the band. Handle with extra care.

- f. Lay the X-axis moving cable in the cable trough, starting with the LYP1 card (accessor end of the cable) at the left end of the Control Module with the metal side of the cable up. Use X-axis cable P/N 301301 for a 3 or 4 frame library.
- g. Plug the cable into the LYP1 card and install the LYP1 cable clamp.
- h. Ensure that the left cable loop is tangent to the cable trough.
- i. Plug the other end of the cable into the Cable Card Mount located on the 2nd frame and install the cable clamp.

**Step 2** Move the accessor assembly along the length of the X-axis moving cable and verify that the cable remains centered in the cable trough. If it does not track evenly:

- a. Adjust the cable clamp at the Cable Card Mount.
- b. Adjust the cable clamp on the LYP1 card.
- c. Adjust the LYP1 card on the mounting plate. You need to remove the Y-axis home sensor to do this procedure.

**Step 3** Install the right end covers (front and rear) that you removed on the last installed frame.

## Install customer supplied Tape drives

### Install 3590/3590E Model B1A/E1A in a Scalar 1000

Make sure you have ordered the kit (P/N 301212) that contains all the hardware necessary to install the 3590 Model B1A in the Scalar 1000.

Refer to Figure 11-11 on page 11-26 for the following procedure:

**Step 1** Open the rear door of the Scalar 1000 frame where the drive is to be installed.

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**Step 2** Install the two slides (P/N 300789) in the Scalar 1000 frame by using two M4x8 per slide. Install the slides so the slide locks (the cables with the screws) are to the rear of the frame.

**Step 3** Extend slides out toward the rear of the frame and remove the inner slides. Note the orientation of this piece of the slide.

**Step 4** Install the inner slides on the 3590-B1A/E1A by using eight M4x8 screws.

Notes for the next step:

- a. Ensure the middle section of the slides is fully extended and locked before you push the drive in place.
- b. When picking up the 3590 drive, **do not** use the cartridge feed slot as a handle to lift the drive as it will damage the loader door or loader. Use the protrusion in the drive enclosure under the cartridge feed slot or the bottom of the drive to lift the 3590 drive.
- c. The 3590 Model B1A/E1A weighs 28.6 kilograms (63 pounds); use caution or get help to safely lift this drive.

 **Caution**

 **Note**

If you do not have the inner slides aligned in the ball bearing retainers, you will damage the slides.

**Step 5** Read this complete step before proceeding. Lift and place the drive in the slides. Hold the ball bearing retainers to the rear while guiding the slides into the ball-bearing retainer assemblies and then push the drive in place. Guide the 3590 onto four or five ball bearings before pushing it forward

**Step 6** Remove the orange head protector from the drive. Refer to the 3590 Maintenance Manual for this procedure.

**Step 7** Install the cable side bracket to the mounting rail holes on the rear of the frame with 2 M5 clip nuts and 2 M5x10 screws. Attach the Cable Dual Clamp to the bracket using 1 M5x10 screw.

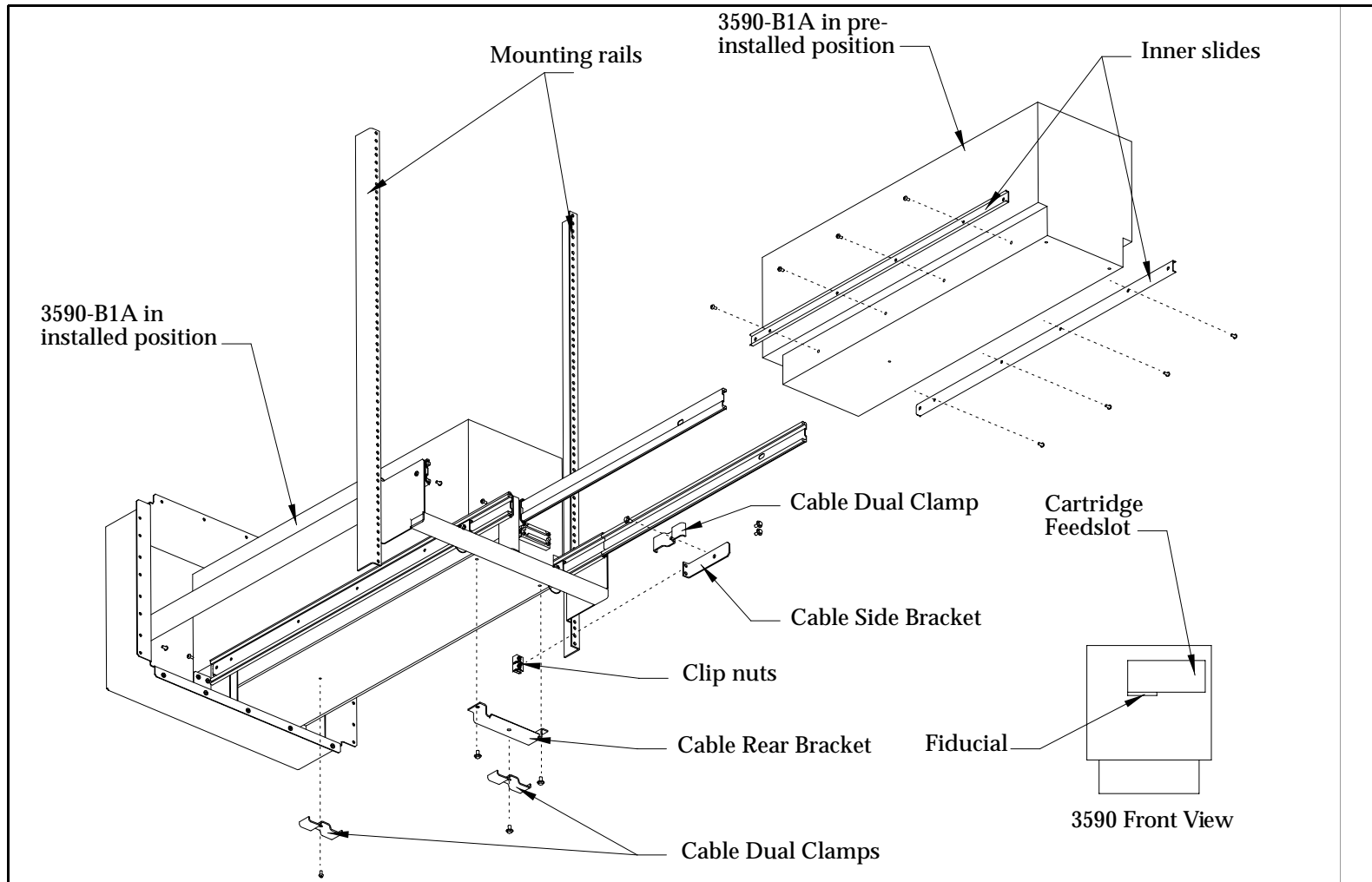
**Step 8** Install the cable rear bracket to the bottom of the drive in the holes located at the rear of the drive with 2 M5x10 screws. Attach the Cable Dual Clamp to the bracket using 1 M5x10 screws.

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**Step 9** Attach the Cable Dual Clamp to the bottom of the drive in the hole located at the front of the drive using 1 M5x10 screw.

**Step 10** Attach the Fiducial label to the lower left corner of the 3590 cover as shown in Figure 11-11 on page 11-26. **Important: The Fiducial label is used by the barcode scanner during Teach so it is very critical that it is applied properly. Apply the fiducial label so its top edge is mated smoothly with the bottom edge of the 3590 feed slot and make sure the label is oriented so that the barcode is on top.**



**Figure 11-11** Install 3590-B1A in the Scalar 1000

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## Cables from Hosts

The Scalar 1000 supports both SCSI-2 Differential and Single Ended attachments via a SCSI-2 P cable with 68-pin D-connector. Differential is a fast and wide 2-byte SCSI-2 attachment. When attaching to a 1-byte host, a 1-byte to 2-byte interposer is required.

The Scalar 1000 can be configured with one or two SCSI adapters. Each SCSI adapter can be differential or single ended and is independent of the other, each adapter is connected to a SCSI bus and each bus must be independently terminated (the terminator is shipped with each adapter). Since The Scalar 1000 only logically supports the one-byte wide protocol, the Library SCSI ID must be in the range of 0-7.

Terminator power is provided by the Scalar 1000 via a jumper on the LSE1/LDF1 card. Refer to Figure 7-24 on page 7-23 or Figure 7-25 on page 7-24.

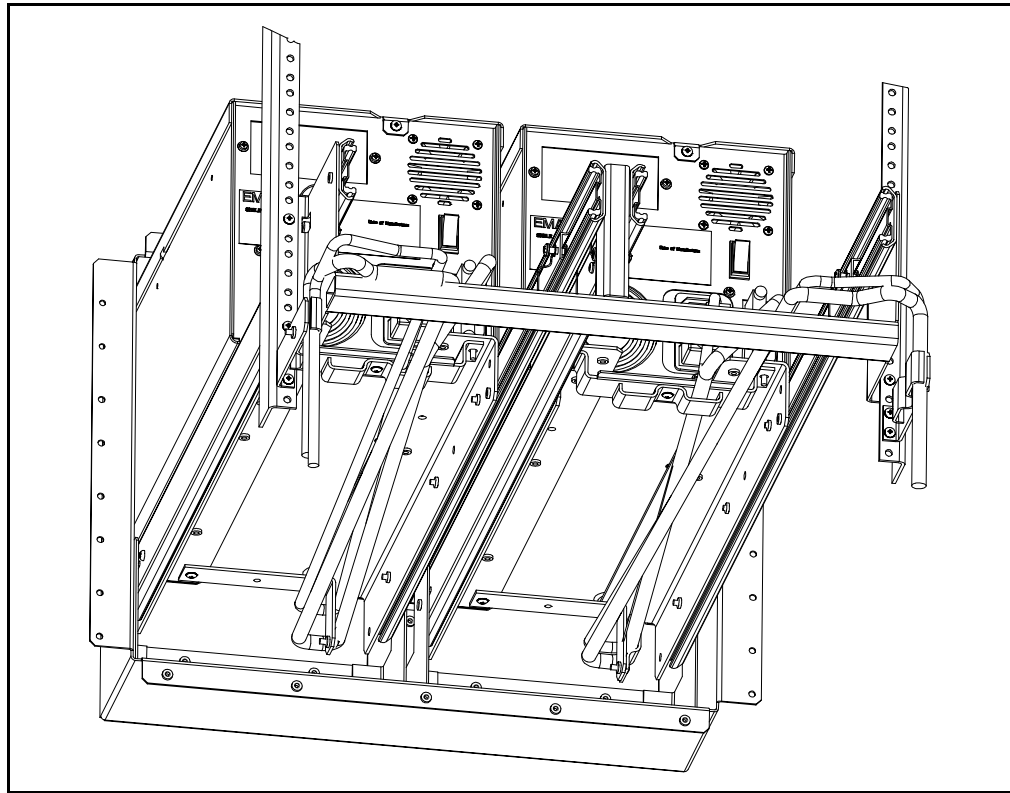
If you are here to install an Expansion Module frame on an existing Library, go to *Installation Checkout* on page 11-29.

### **Note**

The default SCSI ID for each port is 6, this default value will appear when a new LSC card is installed or after a Microcode update.

## Host to Tape Drive

The host cable to the tape drives will be attached during the tape drive checkout in the Installation Checkout section of these instructions. Attach host cable to the tape drive according to customer's configuration. The drive power and SCSI cables must be routed as shown in Figure 11-12 on page 11-28 to allow for service.



**Figure 11-12** Drive Power and SCSI cables routing

## Host to Library


- Step 1** Run the cable from each host to the rear of the Scalar 1000 Control Module frame. Route the cables through the opening in the bottom of the frame, refer to Figure 7-5 on page 7-7.
- Step 2** Connect the cable straight into one connector of the Y block which is attached to each SCSI Adapter card (LDF1 or LSE1), refer to Figure 7-15 on page 7-17 (SCSI port 0 is on the right (Model C10) or on top (Models C20 and C30) when you are facing the rear of the frame).
- Step 3** If this is the last device on the SCSI bus, install the terminator P/N 106514 (Differential) or P/N 106620 (Single Ended) on the other connector of the Y block.

- 
- 
- Step 4** If attaching to the next device in the chain, install the next cable into the other connector of the Y block.

## Voltage Check

- Step 1** If the customer outlet case is conductive (metal), measure for 0 V AC from building ground to the outlet case.
- Step 2** Measure for 0 V AC from the ground pin of the outlet to the building ground.
- Step 3** Measure for less than 1 ohm resistance from the ground pin of the outlet to building ground and from the ground pin of the machine power cord to each frame in the Library.
- Step 4** Measure the customer supplied voltage. The nominal voltage is single-phased 110 V AC. Perform this measurement for all outlets (one for each frame).

**In Europe, the nominal voltage is single phased 230V AC.**

 **Note**  
This is required due to the high leakage current. See Warning label attached to the Scalar 1000.

- Step 5** Connect the ground wire (in the Ship Group) from the Customer ground source to the ground point located in the rear of the Control Module (the ground point is marked with a ground symbol).

**An industrial type plug that meets IEC 309 is required for wiring this product prior to plugging it in the power source.**

- Step 6** Connect the power cables from the Control Module frame and each Expansion Module frame to the customer power source.

## Installation Checkout

- Step 1** Perform Procedure *Accessor Alignment* on page 8-37.
- Step 2** Ensure there is at least one cartridge in the storage area of the library. The cartridge must be the type used in the tape drives installed in the Scalar 1000.

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Make sure that the front doors of all frames are closed.

**Step 3** Set the circuit breaker on the AC Power Compartment of the Control Module and each installed Expansion Module to On.

**Step 4** Remove the green fluorescent tape covering the loaders of the DLT tape drives if these drives are installed in the library subsystem.

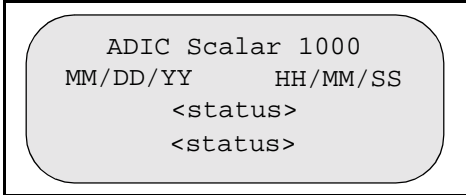
**Step 5** Check out the tape drives, and set the addresses or IDs and attach the host cables as requested by the customer. Use the procedures in the tape drive Maintenance Manual for this step. Put the tape drives in their operating positions.

**Step 6** Set the power switch that controls the +24V and the +48V power supplies in the Control Module to On. The Library should power on.

**Step 7** The Library firmware will initialize and begin the inventory/teach process automatically. Once the following screen appears, use the following steps to put the Library in Ready and Offline states.

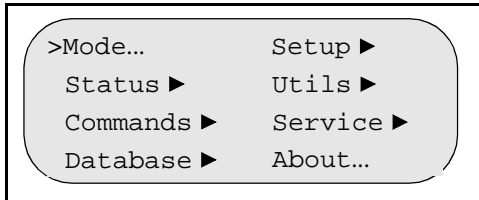
 **Note**

If the Tape drive is the 3590, be sure that the orange plastic head protector is removed and the pneumatic system is properly adjusted for the altitude of the installed location before checking out the drive. Refer to the 3590 tape drive Maintenance Guide for these procedures.



```
ADIC Scalar 1000
MM/DD/YY      HH/MM/SS
<status>
<status>
```

Press Enter for the following Main screen and then select Mode then Offline and Ready:



```
>Mode...      Setup ►
Status ►      Utils ►
Commands ►    Service ►
Database ►    About...
```

---

---

MODE	STATE
> Online	*Ready
*Offline	Not Ready
(* = current)	

**Step 8** Run Library Self-Test from the Operator Panel using the following steps:

Select Service from the following menu:

Mode...	Setup ▶
Status ▶	Utils ▶
Commands ▶	>Service ▶
Database ▶	About...

Select Diags from the following menu:

Start...	Demo...
>Diags ▶	Advanced...
Teach ▶	
SAC...	

Select Self Test from the following menu:

DI/DO...	>SelfTest...
Gripper...	
Scanner...	
Accessor...	

## Post-Installation

**Step 1** The Library is installed. Give the customer both keys. The front door key with the triangle opening is given to the Operator to load the storage racks with cartridges. The rear door key with the square

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opening is used by the System Administrator to reconfigure the Library.

- Step 2** Complete the installation record. The Scalar 1000 serial number is located on the Product Label affixed on the rear door of the Control Module frame.
- Step 3** Store the Scalar 1000 tools, manuals and Firmware diskette. Keep them available for service activity.

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